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The Importance of Studying the Diseases of the Cow's Mammary Gland.*

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INTRODUCTORY.

Some four years ago it was agreed by the Committee of Management of the Research Institute of the Royal Veterinary College, with which I am associated, that a study of the diseases of the cow's mammary gland should form the major subject for research at the Institute. This decision was arrived at primarily on account of the losses which these diseases were known to be inflicting upon agriculture. It was realised that the task proposed was no light one and that it would involve many and varied problems. It was realised also that the subject had engaged the attention of a number of workers in the past, more particularly in the United States and in Central Europe. In this country the work carried out by Savage 25 or 30 years ago is to be mentioned. Hence, we were prepared to find that a good deal of information had already been acquired. Since then practical experience of the subject and a more intimate acquaintance with its literature have enabled us to grasp to greater advantage the problems involved and to focus our attention upon the points where further investigation was required. Suffice it to say that although a good deal is known, our knowledge in very many respects is still imperfect.

In this address I shall attempt to show, as briefly as possible, something of the extent of the field we are investigating, the importance to be attached to this study and some of the results which may be expected to arise from it. The subject will be treated from three points of view, which I will call the agricultural, the public health and the pathological aspects respectively.

THE AGRICULTURAL ASPECT.

It is commonplace to remark that mastitis or inflammation of the mammary gland is of importance to agriculture. Dairy farmers know only too well the condition spoken of as "garget," and that it usually leads to destruction of at least some portion of the gland. Most of them are also aware of the fact that from time to time less pronounced or minor disturbances of the milk secretion occur. Nowadays, it is understood that there are several kinds of mastitis, due to different species of bacteria, and that the commonest of these is a chronic form with a somewhat insidious course caused by a certain species of streptococcus. In this form the general health of the cow is not appreciably affected, the local symptoms are often obscure, and the pathological changes in the milk may not be obvious. As a rule, however, the gland remains infected for long periods and no curative treatment has proved to be of avail. Unfortunately, it is not sufficiently recognised that these less pronounced disturbances are responsible in the aggregate for far more loss than the more severe but less prevalent forms of the disease which go by the name of "garget."

More exact methods of diagnosis have made it clear that this streptococcus form of mastitis is extremely widespread, the losses being generally most noticeable in larger herds. I do not propose to present a series of figures to illustrate its prevalence. On a former occasion I have pointed out that some of the published figures cannot be looked upon as revealing the full extent of the disease, because the methods of diagnosis used were not always sufficiently searching. Up to the present, our observations relate to just over 1,100 cows belonging to 20 herds. Of these cows 446, or about 40 per cent., were harbouring pathogenic streptococci in one or more quarters, the incidence in each herd varying from 11 to 65 per cent. In most cases definite symptoms were absent and at a given moment abnormalities would not have been detected except by laboratory methods, such as we employed. It is true that these herds were in some measure selected, but we have no reason to think that the high average percentage of infection was due to this fact. Actually, of the 20 herds five were producing certified milk and eight others could be classed as "clean," but the degree of infection appeared to bear no relation to the class of herd. From these observations I believe that at a fair estimate in most of the larger herds in this country on an average not less than 25 per cent. of the milking cows are infected in at least one quarter with mastitis bacteria, chiefly streptococci. Judging from the reports of some foreign countries, *e.g.*, Germany, it is not to be supposed that the position of milking herds in Great Britain is unique in this respect. At first sight perhaps the figures quoted are surprising, but they are not dissimilar from those of certain other contagious diseases of cattle, *e.g.*, tuberculosis and abortion, and they are probably to be explained by the great opportunities for spread which arise from the existence of latent cases and the habit of milking cows indiscriminately.

In the light of this wide prevalence of mastitis, what then is the real significance of the disease to the dairy farmer? Firstly, from the fact that the disease produces more or less extensive destruction of milk-secreting tissue it may be inferred that, as the disease progresses, cows will give less and less milk. As to the magnitude of this loss we have no precise conception, but it is to be hoped that reliable information on a sufficiently large scale may be obtained on this point. In these days of overproduction of milk this diminution in yield may at first thought make no great appeal. So far as agriculture is concerned, however, this is by no means the whole story. Thus, the incidence is distinctly greater among

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cows over four or five years of age, *i.e.*, in cows which have reached a high level of milk production. There must also be considered the excessive herd wastage, the depreciation in the value of the infected animal, the extra labour and expense involved in treatment, the expense of maintaining a larger number of animals than are required to fulfil the milk contract. Cows with latent infection are, as it were, standing on the edge of a precipice, so that interference from any cause with the normal routine of milking is likely to be followed by clinical symptoms. More rarely, disease of the udder leads to the death or compulsory slaughter of the affected animal. Lastly, it cannot be doubted that at least some forms of mastitis spread by contagion.

The Public Health Aspect.

This cannot be entirely separated from the agricultural aspect of the matter, because every producer is in large measure responsible for providing a clean and safe milk supply, and many are fully alive to the necessity of doing so. This responsibility also partly rests with the distributors, many of whom require that the milk received from the producer shall reach a certain quality and a certain standard of cleanliness.

So far as cleanliness is concerned, and apart from the question of one particular disease, *viz.*, tuberculosis, attention has been chiefly focussed upon clean methods of drawing the milk and upon preventing subsequent contamination of the product. I do not of course wish to underrate in any way the importance of these points, but speaking generally too little notice has been taken of the effect of udder disease in this connection. Milk that is obviously altered in character on account of disease of the gland will not be added to the milk pail. But, as stated previously, the gland is frequently infected without definite clinical signs and without strikingly obvious change in the appearance of the milk. Nevertheless, such milk may contain large numbers of mastitis bacteria, usually streptococci, as well as the products of inflammatory reaction, *viz.*, tissue cells, blood serum, fibrin, and red blood corpuscles. There will also be changes in the normal milk constituents, notably a reduction in lactose and an increase in chlorides, causing the milk to assume a salty taste. This not only renders the secretion unpalatable, but may also make it unfit for butter and cheese manufacture. The fact that in the past so little regard has been given to contamination of the milk at its source with the products of udder disease can be explained on several grounds. Firstly, unclean conditions after milking are principally responsible for the process of souring. Secondly, it is clear that ordinary mastitis streptococci are not harmful when consumed by human beings. Thirdly, there is usually considerable dilution with normal milk.

It is manifestly undesirable that milk containing mastitis bacteria and the products of tissue reaction should find its way to the consuming public, even though it passes through a pasteurising plant *en route*. It is submitted that a good deal towards preventing this could be accomplished by milk-distributing companies in collaboration with their producers.

Of the diseases which are communicable to man by cow's milk, tuberculosis stands first. This fact is so obvious and has received so much consideration in the past that it is not proposed to develop the matter further here. The principal epidemic diseases, which from time to time have been attributed to the consumption of milk, are typhoid and paratyphoid fever, diphtheria, summer diarrhœa in infants, scarlet fever and septic tonsillitis. In the case of the three first-named, there is not much to show that the cow herself acts as the common source, though it is true that in a few rare instances diphtheria bacilli have been isolated from lesions on the teats of milking cows. In the case of scarlet fever and septic tonsillitis, a little more is to be said, since there is definite evidence that in the past some outbreaks in the human population have been due to contamination of the milk at its source. In these cases the epidemiological history points with extreme force to an actual infection of the cow's udder with pathogenic streptococci, derived in the first instance from man. Observations in the United States by Jones and Little and others have afforded some direct evidence in support of this view. Such outbreaks arise from infection of one or two cows only in the herd, so that bacteriological examination of small groups of cows and subsequently of individual cows is the only way to locate the infected animals. It has also been shown in the United States that in the absence of human epidemics mastitis is occasionally caused by streptococci which cannot be differentiated bacteriologically from those which are associated with septic sore throat in man. That mastitis in the cow may be occasionally caused by hæmolytic streptococci, different from the common bovine variety but indistinguishable from certain human throat streptococci, has been shown by a few observers within recent years, and lately by my colleague, A. W. Stableforth, and myself. The exact significance of this finding is at the moment uncertain, chiefly because in most of these cases of udder infection there was no associated human disease.

The Pathological Aspect.

Inasmuch as pathogenic bacteria are sometimes excreted by way of the mammary gland and in their passage may produce localised disease, a bacteriological study of milk secretion may throw light upon the nature of disease processes taking place elsewhere in the body. As examples may be mentioned *B. tuberculosis, B. pyogenes, B. necrosis* and certain varieties of streptococci. The suggestion that some forms of streptococcus mastitis arise in this way is supported by the observation that symptoms sometimes appear suddenly without any evidence of contagion and in a gland which, so far as can be determined by bacteriological examination, was previously normal. Another example which will immediately present itself to the mind is that of *Br. abortus*, which is so frequently eliminated with the milk. This last instance serves to remind us that the relationship between the genital organs of the female and the mammary gland is not only physiological, but may also be pathological. Similarly, it is probable that other diseases of the genital tract, *e.g.*, streptococcus endometritis, which so frequently brings about sterility, have their counterpart in pathological changes in the udder.

Another point, which deserves to be emphasised here, is that an acquaintance with the bacterial flora, which can be regarded as "normal" to cow's milk, and an ability to recognise pathogenic forms should be a preliminary to studies such as that of the physiology of the gland,

the biochemistry of its secretion, the influence of breed, genetical, nutritional and other factors upon the milk yield or the consumption of milk. It is desirable to be assured that in observations of this nature the work is carried out on cows free of latent infections. When the investigation involves the examination of the milk records of large numbers of animals, this requirement is admittedly difficult to fulfil, but in some of the past work the influence of the disease factor does appear to have been rather neglected.

In the same way, research into the diseases of calfhood or experiments on the rearing of young calves should include careful enquiry into the condition of the mother's mammary gland.

Finally, from the standpoint of the bacteriologist, the mammary gland of the goat or cow would appear to offer a satisfactory means of studying such problems as the biological properties of micro-organisms growing *in vivo* in the face of natural resistance, and problems connected with local immunity and chemotherapy. In this respect the gland, divided as it is into two or four sections, affords an opportunity for comparative investigation.

I trust that enough has now been said to show the importance which I believe should be attached to a patient and thorough study of the diseases of the cow's mammary gland. It can only be hoped that adequate time and funds may be allotted for the continuance of this task.

Discussion on Milk-borne Streptococcus Epidemics.*

Dr. William G. Savage: Streptococci are extremely common in milk, and are derived from many sources. Their mere presence, or even their presence in large numbers, is no evidence that the milk is harmful. Even the demonstrated presence of hæmolytic streptococci is inadequate evidence of potential infectivity, and it is difficult to postulate any series of bacteriological tests which enables us with reasonable facility to determine the infective types of streptococci in milk. On the epidemiological side we are on more definite ground. Two types of infection, now both known to be due to streptococci, have been demonstrated over and over again to have been spread by milk. These diseases are scarlet fever and angina of variable degrees of malignancy. For both we have to consider the possibility of a human and of a bovine origin.

Many epidemics of scarlet fever are admittedly spread by milk, but the possibility of the infection being associated with an infective cow has passed through several phases. In 1885 that acute observer, Sir W. Power, ascribed the Hendon[1] outbreak of scarlet fever to diseased cows. Lacking confirmation, this conception fell into disrepute, almost into derision, in spite of another outbreak in 1909 in certain parts of London and Surrey, ascribed by Hamer and Jones[2] possibly to a bovine source. Critically re-examining all the original data, including Klein's investigations, I came to the conclusion in 1912 that the existence of a constitutional disease, bovine scarlet fever, could not be accepted, but suggested the hypothesis that the cow might be a carrier of the organism in a purely passive capacity. I considered that the Hendon outbreak was spread by *locally* infected cows[3] and added "The suggested hypothesis offers a complete explanation of all the essential facts of the Hendon disease, and reconciles the conflicting views." I am unaware of any investigations of scarlet fever epidemics along this line until sixteen years later, when we had the interesting work of Jones and Little[4]. They describe a scarlet fever outbreak in a small town in New Jersey State. There were human scarlet fever cases on the farm, but when the thirteen cows were examined, one, which had had an injury to the teat, showed clinical mastitis with the presence of abundant hæmolytic streptococci of human type. It was possible to infect other quarters of this cow, and also another cow, with this streptococcus and to set up a severe mastitis. This same organism was found as a cause of mastitis in another cow unconnected with this herd, and not associated with any outbreak or cases of scarlet fever, but this they ascribe to dilution. In their second paper they describe in detail the characters of this organism, and conclude that it is undistinguishable, culturally and as regards certain antigenic affinities, from *S. scarlatinæ*. In another paper Jones[5] found that milk heated at 58° C. for twenty minutes, or filtered through a coarse Berkefield filter, possesses the property of inhibiting the growth of the scarlet fever streptococcus. This was not observable when boiled milk was used. He concludes that this fact throws considerable doubt upon the common view that milk-borne scarlet fever is from direct human contamination of the milk, since this bactericidal power will reduce the risk from occasional and slight contamination from human infection. Incidentally it may be mentioned that Jones and Simms find that under similar conditions with mastitis streptococci there is only a lag of several hours and then rapid multiplication.

If these results can be confirmed they afford strong confirmation to my hypothesis, and suggest that in milk-spread scarlet fever we must also consider the possibility of an infected cow.

The epidemiological facts in relation to epidemics of angina are of considerable interest. In the 20 years' period 1890 to 1910 a number of such outbreaks, all milk-borne, were reported in Great Britain, and in 1911[6] I gave a summary of 18 such epidemics. A typical example was that at Colchester in 1905, when I was Medical Officer of Health of that town, which I described in detail[7].

There were over 600 cases, 96·6 per cent. of which were connected with the milk supplied by one distributor, and it was possible to trace the whole trouble to one of his five sources of supply, and to locate on that farm a cow suffering from mastitis due to streptococci, the milk from which had been added to the supply right up to the time of the outbreak. The exclusion of the milk from this animal caused the immediate cessation of the epidemic.

We have to note the curious fact that since about 1910 these milk-spread angina epidemics have apparently ceased in Great Britain or ceased to be recorded. When the extensive Hove outbreak occurred last winter, to the younger men it almost seemed like a new type of infection. The

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point is of interest because in U.S.A. no outbreaks were reported until 1911, and since that date a very large number are described or referred to in their literature. While most of the more extensive American outbreaks have been associated with an infective cow, human infection of the milk supply is given as the cause in a number of instances. Scamman[8] states that 87 milk-borne outbreaks of scarlet fever have been recorded in U.S.A. between 1893 and 1928, and 45 milk-borne outbreaks of septic sore throat between 1908 and 1928. Of the sore throat outbreaks 55 per cent. were ascribed to a milk handler and 30 per cent. to a diseased cow and a milk handler.

I have not made any detailed investigation of foreign literature but have noted reports of milk-spread sore throat outbreaks occasionally. For example, Madsen[9] describes an outbreak at Kolding, in Jutland, in 1926, affecting some 2,400 persons the exact source of infection not being cleared up. Seelemann[10], however, writing in 1929, mentioned that he was unacquainted with any mastitis milk-borne outbreaks in Germany.

Extensive work has been carried out to elucidate the bacteriology of bovine mastitis and the causation of these angina outbreaks. I will only refer to this aspect in so far as it affects the human problem.

Prior to my investigations for the Local Government Board in 1906-09[11], a few Continental workers had shown that streptococci were a common cause of bovine mastitis, but they were not differentiated to any extent and their possible relationship to human disease was not considered. The streptococci which I found to be the cause of 65 per cent. of my cases of bovine mastitis were nearly all of one type, which I called *S. mastitidis*. An interesting feature which I have not noted in subsequent work was the usual (in 84 per cent.) presence of this identical strain in quarters clinically perfectly sound and seldom subsequently involved. Its presence was associated with considerable cellular increase but the milk was unaltered to the naked eye.

My essential interest being in the human infection possibilities, many comparative experiments were carried out with this strain and with pathogenic human types. Morphologically and culturally the differences were not clear-cut, while hæmolytic tests were not employed. On the other hand there were definite differences of pathogenicity. The bovine type was non-pathogenic to mice and of low virulence to laboratory animals generally, but it readily set up mastitis in goats when introduced into the teat canal without any injury to the mucosa. The human types were pathogenic to mice. Of 15 strains of human origin, one from a healthy throat, six from sore throat sufferers (two scarlet fever, four tonsillitis) and four from other human diseases, 13 failed to produce mastitis in goats, while two produced some degree of mastitis. The two latter were from cases of Ludwig's angina and acute erysipelas respectively. From my work I satisfied myself that *Streptococcus mastitidis* was not a cause of human disease, so much so that on two separate occasions I swabbed my own throat with massive doses of this streptococcus, isolated only a few days previously from cases of cow mastitis, without local or constitutional effect. The streptococcus could only be recovered with extreme difficulty from my throat, showing that this strain was in an alien habitat.

As mentioned, *S. mastitidis* was not invariable in bovine mastitis, and one case was due to a streptococcus of extremely high virulence to rodents and of quite different type.

I have ventured to recall these ancient experiments because I believe they go to the root of the matter and offer a satisfactory explanation of the striking fact that while bovine mastitis is extremely common, human outbreaks of angina associated with a cow, suffering from what appears to be ordinary bovine mastitis, are decidedly rare. In a paper read before this Section of Epidemiology[12] just over 20 years ago (February, 1911), I said: "Briefly stated, I regard the bovine udder and teat lesions, as commonly met with, as of purely bovine origin and, as such, harmless to man. Occasionally, either as an invasion superadded upon the original bovine lesions or as a primary infection of the milk organs, there is a local infection with organisms of human origin. In other words, the cow, in this class of infection, is only potentially pathogenic to man when it acts as an active or passive carrier of organisms of *human* origin." The work done since that date, mainly in America, strongly supports this hypothesis, and I re-advance it here as the basic fact in the relationship of bovine streptococcal diseases to milk-borne human infections.

The first milk-borne sore throat epidemic in U.S.A. was reported by Winslow,[13] in Eastern Massachusetts, in 1911, but without bacteriological investigations. The Chicago outbreak in December, 1911, to January, 1912, which affected over 10,000 persons was carefully studied bacteriologically by Davis,[14] who emphasised the point that in these human outbreaks hæmolytic streptococci were responsible, differing from the type associated with bovine mastitis. This point was also stressed by Theobald Smith and Brown.[15] Davis and Capps[16] showed experimentally that hæmolytic streptococci of human origin can cause mastitis in cows when introduced into the udder in large numbers by catheter. When smeared on the surface of the teats without injury the results were negative but mastitis resulted when the teats were slightly abraded. The American workers have designated the type of streptococcus associated with these human epidemics as *Streptococcus epidemicus* and have gradually built up a series of refined tests, which they claim are adequate to distinguish this type from *S. mastitidis* and from other streptococci. The valuable work of F. S. Jones, set out in numerous papers, merits special mention, while the work of Brown and Orcutt[17] in connection with an outbreak of sore throat in Boston, in 1917, is also of interest, as they claim to have been able to identify the infective strain both from the mastitis fluid and from the sore throats of the sufferers. Recently Frost, Gumm and Hadley[18] have isolated *S. epidemicus* from 17 individual cows in all, and while two were associated with epidemics of human sore throat, no human infections were traced from the other milk supplies. In eight cases the milk was normal, in nine abnormal. In a later paper Hadley, Frost, Gumm and Welsh[19] give particulars of another cow so infected and associated with sore throat cases, and of five other cows excreting *S. epidemicus* but with no clinical cases.

Summing up the epidemiological side of the subject, there is abundant evidence that milk can serve as a

vehicle for two kinds of streptococcal infection—scarlet fever and angina. Only particular types of streptococci are involved in this infection and they may gain access to the milk from either human or bovine sources. There is considerable evidence that the cow only serves as an infective agent when the streptococci are initially of human origin implanted on the cow's teats or introduced into the udder. Our knowledge is inadequate as to the conditions under which this occurs, but there is evidence that ulcerations or other slight lesions are factors facilitating infection. At present we are unable clinically to indicate whether a case of bovine mastitis is harmless to man or is a potential source of human infection, but bacteriological examinations are probably adequate to distinguish. The facts, however, show that the type infective to man is of great rarity.

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[2]*Report to the London County Council,* 1909.
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[4]*Journ. of Exper. Med.,* 1928, xlvii, 945 and 957.
[5]*Ib.,* 1928, xlvii, 965.
[6]*Proc. Roy. Soc. Med.,* 1911, iv (Sect. Epid. 73).
[7]*Public Health,* 1905-06, xviii, p. 1.
[8]*Amer. Journ. Pub. Health,* 1929, xix, 1339.
[9]*Public Health,* 1930, xliii, 168.
[10]*Arch. of Wiss. u. Prakt. Tierheilk.,* 1929, lx, 534.
[11]*Report of the Medical Officer,* L.G.B., 1906-07, 1907-08, 1908-09.
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[13]*Journ. Infect. Dis.,* 1912, x, 73.
[14]*Journ. Infect. Dis.,* 1914, xv, 378, and 1916, xix, 236.
[15]*Journ. Med. Res.,* 1914, xxxi, 455.
[16]*Journ. Infect. Dis.,* 1914, xv, 135.
[17]*Journ. Exper. Med.,* 1920, xxxi, 49.
[18]*Journ. Infect. Dis.,* 1930, xlvi, 240.
[19]*Journ. Amer. Vet. Med. Assoc.,* 1930, lxxvii, 328.

Dr. F. C. Minett: Although 20 years have now elapsed since this subject was last considered before the Society, it is doubtful whether it would have been brought up for discussion at the present time had it not been for the extensive milk-borne epidemic of sore-throat which occurred at Hove during the winter of 1929-30.

Dr. Savage has referred to the past incidence of these outbreaks in Great Britain and the United States. Although such outbreaks are not common, a good many have been recorded. One noteworthy feature in connection with them in contrast with epidemics of milk-borne typhoid is the relatively large number of persons attacked.

The Bacteriology of Mastitis, with Special Reference to the Occurrence of Streptococci Indistinguishable from Streptococcus pyogenes from Man.

As has been pointed out, in many outbreaks suspicion has pointed to the cow as the source of infection. For this reason it is necessary to speak of those extremely prevalent forms of mastitis which are caused by streptococci.

Mastitis may be caused by hæmolytic or non-hæmolytic streptococci, but for the present there need only be considered the variety referred to by J. H. Brown (1919) as "beta-hæmolytic." With most of the strains of this variety, which can be cultivated from milk, the area of hæmolysis about deep colonies in ox blood-agar, though distinct is narrow, and when growing in 15 per cent. serum broth the strains usually produce little or no demonstrable hæmolysin. I would refer to three characters which are common to the great majority of udder hæmolytic strains, characters which at the same time serve to distinguish them from *S. pyogenes* from human sources. The first is their lack of pathogenicity for laboratory animals, such as mice and rabbits, and the accepted fact that they are not dangerous to man. The second character is that when grown in 1 per cent. lactose broth for five days relatively large amounts of acid are produced, so that the final pH comes to rest at 4·4 to 4·8. The third character is the ability of udder streptococci to hydrolise sodium hippurate to glycocoll and benzoic acid. On the other hand, *S. pyogenes* from human sources is often highly pathogenic for small laboratory animals; strains as a rule do not send the pH of lactose broth below pH 5·0, and often not below pH 5·2 to 5·6, and they do not split sodium hippurate. These two tests have been widely used in the United States, and we have examined a considerable number of hæmolytic udder strains and strains of *S. pyogenes* from man by these two tests and are impressed by their reliability for differential purposes.

Up to the present we have met with 13 cases of mastitis from the udder secretion of which we have isolated non-encapsulated hæmolytic streptococci with characters different from those ordinarily found. In at least seven of the cases these streptococci appear to have been the cause of the mastitis. These strains were exceptional in producing relatively large amounts of hæmolysin and in their high pathogenicity for mice and rabbits. None of them depressed the pH of lactose broth below 5·0, or attacked sodium hippurate. In all these respects they resembled streptococci from human sources far more closely than typical udder streptococci. Serological observations pointing to the same conclusion will be mentioned by a subsequent speaker. Four of these strains, including one which produced small amounts of toxin, were examined on our behalf by Dr. F. Griffith, who found them to be indistinguishable from *S. pyogenes* of human origin, though not identical with any of the types at present in his possession.

The most reasonable explanation is that in these cases the cow's udder was infected with streptococci from a human source, no doubt from the milker. This explanation, however, cannot be accepted offhand, largely because inquiry failed to elicit information as to definite human disease associated with cases. Since these 13 cases occurred in a series of 52 proved to be associated with hæmolytic streptococci, it would seem that infection of the udder with streptococci possessing the special characters referred to is less rare than has been supposed hitherto. It is to be emphasised that these cases were unselected in any way except that they were of sufficient severity to require veterinary attendance. Each of the 13 strains was from a different cow and all the cows, except four, were on different farms and in different districts. So far as has been gathered all the cows were hand-milked.*

*Since this meeting a detailed account of these observations has been published in the *Journal of Comparative Pathology and Therapeutics,* 1931, xliv, 114-125.

The Part Played by the Cow in Milk-borne Streptococcus Epidemics.

The hypothesis put forward by Savage (1911) was strongly suggestive, and the investigations of Jones and Little (1928) and others in America may be held to have proved that the cow has played a major part in some epidemics. The important question at the moment is whether the proportion of outbreaks in which the cow is involved is large or small. A common opinion seems to be that this proportion is small. On the other hand, there are strong reasons why in definitely milk-borne outbreaks the extent of the danger from the bovine source should not be under-estimated. The reasons may be stated briefly as follows. The magnitude of many of the outbreaks, in which hundreds or even thousands of people are affected, and their continuous nature, make it difficult to believe in direct contamination from a human source, but point to heavy and continuous contamination of the milk supply, such as could only arise from growth of pathogenic streptococci within the udder. In some outbreaks exclusion of the suspected cow has promptly stopped the outbreak. The fact that the cow has been proved to be the immediate source of infection in some outbreaks increases the probability that she may be the immediate source in outbreaks with a similar epidemiological history.

This point of view is also in conformity with the following experimental observations :—

(1) In cows found to be harbouring in the udder streptococci of human origin, the number of these organisms in the milk often reaches one or two hundred millions per c.c., so that the milk from one cow would be sufficient to contaminate heavily large quantities of it. On the other hand, there is evidence (Davis, 1914) that in milk kept at temperatures up to 20° C. only a very slight increase in the numbers of hæmolytic streptococci takes place during the first 48 hours.

(2) With such cows the excretion of streptococci in the milk may continue for weeks or months.

(3) In the earlier stages of infection there may be no obvious alteration in the milk and no clinical mastitis. The contaminated milk would therefore be added to the milk pail.

(4) Streptococci from human sources have been proved to be capable of producing mastitis when small numbers are introduced into the cow's udder by the teat canal, or when discharge containing them is smeared upon an abraded surface of the teat close to the meatus.

If then the importance of the cow in these epidemics is admitted, why do not outbreaks occur more frequently? I would suggest that their rarity may not be due solely to the fact that most udder streptococci are of the bovine type, but in part to the fact that human hæmolytic streptococci, which are perhaps not infrequently implanted in the udder, are of a type, or in a phase, which is relatively harmless to man. There is further evidence that when streptococci present in the udder are of a type recognised to be harmful to man, they do not always cause epidemics. Why, again, do these epidemics, with one exception, appear to have ceased in this country about 1910? Can any light be thrown on these points by considering the past incidence of scarlet fever and angina in rural districts in this country?

In conclusion, I would point to the need for further research on this subject, and particularly in connection with the part played by the cow. In this work medical and veterinary collaboration would be very desirable.

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Savage, W. G. *Proc. Roy. Soc. Med.*, 1911 (Sect. Epid., 74).

Lieut.-Colonel E. Wilkinson: With regard to the Hove epidemic Dr. Minett has said that he failed to find " human " streptococci in the milk of the cows because he was too late. As the disease was not notifiable, some time elapsed before the cases were brought to the notice of any health authority, and it was thus that no bacteriological examination of the milk of the cows on the farm was undertaken until some time after the outbreak had ceased. The investigations of Capp and Davis in America show that when " human " streptococci are (applied to abrasions on the teats) injected into the milk channels of the cow their proliferation is enormous and lasts several weeks. In fact, the American workers say that the streptococci last in the milk for about the same time as a human epidemic of tonsillitis.

The history of the Hove epidemic is as follows: During the latter part of November and most of December, 1929, a series of cases of tonsillitis occurred, several of which proved fatal. Altogether there were more than a thousand cases, and over 60 deaths. It was not till mid-December that it was noted that nearly all the patients were customers of one particular dairy, and towards the end of the month the Medical Officer of Health examined samples of all the various milks from the farms which supplied this dairy and found one sample crowded with streptococci. The examination was only microscopical, not cultural. It is curious that although streptococci of bovine type are common in milk, yet the only milk in which streptococci were found in large numbers was that from one farm. Investigations at this farm showed that cases of tonsillitis had been occurring there at the same time as at Hove. Moreover, hæmolytic streptococci of similar type to that obtained from the Hove patients were recovered from certain of the patients at the farm. Naturally, search was made for this organism in the milk of the cows at the farm, but without success. It was, however, important to note that although no cow was found at the time of the investigation to be excreting " human " streptococci, yet the condition of some of the cows at the farm was such that had streptococci from a human source been introduced, they would have had ample opportunity of proliferation.

Davis and Capp showed that uninjured udders and teats of cows could be smeared with cultures of " human " streptococci and infective swabs from the human throat and no infection would follow, yet if there were an abrasion on the teats mastitis would ensue, and though mild and causing little in the way of symptoms in the cow, would result in an enormous proliferation of the " human " streptococci in the milk. It was probably because of such great proliferation of these " human " organisms that the Medical Officer of Health, of Hove, was able to find them only in the sample of milk from this farm, among the many samples from other farms he examined at the dairy. In this case the illnesses at the farm and the Hove epidemic occurred at the same time. It was not as if there had been a prior illness at the farm which had resulted in an outbreak in the town, but the patients at the farm and in the town were ill almost at the same time and would thus appear to have been infected simultaneously.

The question thus arises: Where did the infection come from? There was reason to believe that it was introduced

from outside this country, but the information was not sufficiently definite to allow positive assertion. It was, however, a fact that an employee of the farm visited daily a house where, just previously, there had been illness of the same type, and he may have conveyed the organism to the cows under his charge, many of which were suffering from mastitis at the time. The sequence of events seems to have been as follows: First the occurrence of a case of tonsillitis in a house visited daily by an employee of a farm, then the transference of infection by this employee from the house to one or more cows at the farm, and finally the spread of infection both at the farm and in the town through the milk of these cows, which was the only thing exclusively common to both.

Mr. A. W. Stableforth: I am confining my remarks to the possibility of distinguishing between streptococci of human and bovine origin by serological methods. During the last two years I have been studying the streptococci which we have isolated at the Research Institute in Animal Pathology at Camden Town. I have examined 140 strains from the bovine udder and, more recently, have compared these with about 50 strains of human origin. The human strains have been collected from various sources, but more than half have come to me through the kindness of Dr. F. Griffith. His strains are of great value, because they are of distinct serological types. I have also examined two strains of the type commonly associated with epidemic sore throat in the U.S.A., and the two scarlatina strains isolated from cows by Jones.

The methods included a precipitin technique using an extract made with hot N/20 hydrochloric acid, and a rapid agglutination technique. The results were parallel. Sera were prepared in rabbits and goats, and made specific for one type of antigen by preliminary absorption with selected heterologous strains. Direct results were checked by specific absorption with graded amounts of streptococci.

Results.—Ninety-four of the bovine strains were non-hæmolytic and of these I will only say that 61 were classified into three distinct types, whilst the remaining 33, in nearly all cases mannite fermenters, formed a more mixed collection. None of these non-hæmolytics showed any similarity to human hæmolytic streptococci.

Forty-six bovine strains were hæmolytic, and of these 25 were similar serologically, and like the type 1 non-hæmolytics. Five other hæmolytics gave two more types.

The remaining strains have been already referred to by Dr. Minett. They were notable for the width of the hæmolysed zone produced on or in blood-agar, and for a marked degree of lytic action on red cells in suspension. These strains were serologically distinct from the other bovine strains, giving no group-reaction with either hæmolytics or non-hæmolytics. Two strains were peculiar, but the remaining 14 showed evidence of common group antigens, and, as far as my results at present indicate, are of three specific types. Some of these strains show a group likeness to certain human strains, but none of them have given a specific cross reaction. They have been tested with sera prepared from six of the most common human types and, *vice versa*, sera prepared from three representatives of this markedly hæmolytic bovine group have been used to test suspensions or extracts of the various types of human strains.

Summarising: It is clear that most of the strains isolated from the bovine udder are distinct from *S. pyogenes*, but that there often exist in the bovine udder members of a group of markedly hæmolytic streptococci, unlike the ordinary bovine types but with a group likeness to certain types of human *S. pyogenes*. So far, however, no specific likeness has been found.

Professor G. S. Wilson said that the cows affected with disease in the Hendon outbreak were said to have had ulcers on their teats. Subsequently disease broke out in Wiltshire, and cases of scarlet fever followed. It was highly probable that streptococci from the throats of human carriers on the farm were implanted on the ulcer on the teat. There was a striking example in a public health laboratory examination, in which cases of diphtheria were traced to a certain milk supply. The cows on the farm were examined, and one cow was found to have an ulcer on the teat. Cultures from the ulcer yielded virulent diphtheria bacilli on two occasions, and it was a fairly clear instance of a pathogenic organism which did not usually cause mastitis, yet able to proliferate on a local lesion of the cow's teat. He wondered whether the infrequency of Hendon cow disease to-day had any relation to the comparative absence of milk epidemics in this country since 1911. He himself had seen no reference to the Hendon cow disease during the last 20 years, and if, as seemed clear, in this country at any rate, milk-borne epidemics or outbreaks of septic sore throat and scarlet fever were not now common, it might be that some condition in the cow was necessary to enable the successful implantation of the organisms of scarlet fever and septic sore throat to occur.

Mr. Sidney Villar said that he was conversant with the Hendon outbreak, as he had been called in and seen the affected cows, and he was able to support Dr. Savage's suggestion that the cow was a passive carrier.

The point he wished to make was that the Hendon cows did not suffer from mastitis as ordinarily understood; they were affected with a condition usually known as cow-pox, though it was not true vaccinia. It was a disease characterised by the formation of vesicles on the teat. These vesicles were broken down in the process of milking, and a continuance of the milking caused severe ulceration. There were about 70 cows on the premises at his visit, and about 50 of them had sore teats.

Though it did not come out in the inquiry it was known in the neighbourhood that one of the milkmen engaged on the farm lived in a house where a girl had been suffering from scarlet fever, a disease which he believed was in those days not notifiable.

This disease of the teats still existed in cows, and he had seen it many times since. Certainly farm hands did not recognise how rapidly it was spread; usually the animals first showing symptoms were newly bought cows, and he had frequently advised owners to isolate these for a time and to use lysol or other disinfectants.

He had known eruptions on cows' teats associated with septic sore throats in the consumers of milk on two occasions; not many persons were affected because the milk was not sold in either case but was used mostly in the owners' households.

In an outbreak of so-called "cow-pox" occurring at Willesden Dr. Dean had isolated, from a sore on the teat, the diphtheria bacillus. It was found that diphtheria had first occurred in the child of a gardener who worked on the premises and was concerned with the cows. In the owner's household there occurred a number of cases of sore throat.

Another outbreak with which he was associated and whose origin was at first ascribed to animals on the farm was one of typhoid. In this outbreak the dairy utensils had been cleansed with water from a surface well on the premises. It was in the haymaking season when a number of imported people had been employed, and there is no doubt that the water in the surface well was contaminated with fæcal material. In that outbreak there were, he thought, 16 human deaths.

He did not think the occurrence of streptococcic mastitis could be very dangerous as so many cows were affected with it, and one heard of but few cases of illness among the consumers. It was the custom to discard milk which came from the infected quarter and to use that which was obtained from the remaining three-quarters of the udder if its appearance was satisfactory; many gallons of milk from such cows must be consumed every day.

Lieut.-Colonel Wilkinson, in reply to a question, said he had recently had to deal with an outbreak of scarlet fever associated with tonsillitis, and the contrast between that and the other outbreak was interesting. The recent outbreak was limited to one dairy, but the two farms from which its milk came were free from suspicion. In contrast with the other this was a small epidemic, and most of the cases occurred among the customers supplied by one of three roundsmen who, although he denied any

indisposition, except a "rough throat," was found to be desquamating shortly after the outbreak ceased, when hæmolytic streptococci were recovered from his throat. Similar hæmolytic streptococci were recovered from scarlet fever patients and from patients who had suffered from tonsillitis—and also from certain persons who had no symptoms of either. One of these last was the proprietor of the dairy. The former widespread epidemic was probably the result of infection of the udder of one or more cows with "human" streptococci, while in recent small outbreaks these organisms were probably introduced into the milk daily by a milkman harbouring them in his throat.

Professor G. H. Wooldridge (Chairman) said that in Mr. Villar the profession had probably the sole surviving contact with the historic outbreak at Hendon, and the history he had given corresponded closely with that which had been given to him (the speaker) by others who had been in contact with that epidemic. The informants were definitely of the opinion that the disease from which the cattle were suffering—an eruptive condition of the udder—was not associated with the outbreak of scarlet fever among the consumers of the milk. The history of that outbreak was precisely similar to the outbreak mentioned by Dr. Wilson, *i.e.*, as to one of the cowmen visiting a household where there had been scarlet fever just previously. The cowman had probably implanted the infective material on to the cows in question. As had been said, there were no symptoms of mastitis in the cows, which were probably passive carriers, but the teat sores were probably the media of transfer. This teat condition was common and was a form of impetigo, especially frequent soon after calving.

He had himself once afforded an unwitting proof of the non-infectivity of milk with a high content of *Streptococcus mastiditis*. In 1904, when he was in Ireland, a cow in the college, used for demonstration purposes, supplied milk which was regularly drunk by himself, three other adults and four children. On one occasion he thought he detected a salty flavour in the milk and made a microscopical examination of it. He found it to be teeming with chains of streptococci. Clinically there was nothing wrong with the cow. None of the eight persons who had been drinking that milk had sore throat or any other symptom of illness.

Dr. Savage (in reply) said it was a matter of gratification to him that his views, advanced in 1911—at that date new and received with considerable scepticism—(*e.g.*, as to a cow carrying the disease in a local way) were now accepted as a recognised part of preventive medicine.

Dr. Minett seemed to think the present rarity of outbreaks might be partly due to the fact that the human streptococcus was in a stage which was less harmful to man. Professor Wilson thought it was because the cow was not now so liable to be a carrier. He himself believed that it might be in part a matter of dosage. In the Colchester outbreak, although he was single-handed, he had worked out the incidence of cases on the different milk rounds. The milk distributor obtained his supplies from five different farms. The infection was localised to the milk from one particular farm, and he (Dr. Savage) found that when the milk had reached a certain dilution there were no cases.

Dr. Minett, in reply to a point put by Professor Wilson, said that the teat ulceration arising during the course of true cow-pox infection appeared to be rare nowadays. There was no reason, however, for believing that ordinary injuries of the teats, *e.g.*, chapped or sore teats, were less common now than formerly. He would rather suppose that the apparent absence of milk-borne streptococcus epidemics at the present time was due to a lower incidence of human infection with the streptococci in question.

It is partly owing to her insular position and partly due to the possession of an active and efficient State veterinary service and a large army of skilled private veterinary practitioners that Britain enjoys comparative freedom from the more serious contagious animal diseases. —*Scottish Farmer.*

Figures Relating to the Distribution of Tuberculous Lesions in the Bovine Udder.

H. T. Matthews, F.R.C.V.S.
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The following table is an analysis of two separate series of cases of bovine tuberculous mastitis and shows the quarter or quarters of the udder in which the disease was evident.

Wall's series is taken from his publication, "Mastitis of the Cow," Sven Wall, trans. Crocker, Lippincott, 1918. His cases are in Swedish cows and the figures are a record of *post-mortem* findings. He differentiates between primary and embolic infections of the udder, basing the distinction on the absence or presence of lung lesions. As the premise appears to be unsound I have here combined his two series into one of 124 cases.

My series of 200 cases in English cows is compiled in a different way. The figures show the quarter in which the disease was evident during life. *Post-mortem* examination frequently showed extension of the lesions into quarters that presented no clinical evidence of abnormality, but no figures have been recorded owing to the difficulty of deciding that any quarter is entirely free on macroscopic view alone, or that slight lesions are actually tubercle. The two series side by side are interesting as much for their differences as for their points of agreement.

Perhaps the most striking figures are those showing the heavy preponderance of lesions in the hindquarters. There is a fairly distinct predilection towards the left half of the udder. Diagonally opposed distributions appear in both series and comprise five cases involving left hind and right fore, and four cases right hind and left fore quarters.

Table showing the Quarter or Quarters involved in Tuberculosis of the Bovine Udder.

		Wall. *Post-mortem.* *124 cases.*	Writer. Clinical. *200 cases.*	Wall. *Percentages.*	Writer. *Percentages.*
A single quarter		59	169	47·6	84·5
Two quarters	Total	65	31	52·4	15·5
	Alone	41	27	33·0	13·5
Three quarters	Total	24	4	19·3	2·0
	Alone	15	0	12·1	0
All four quarters		9	4	7·3	2·0
In the posterior half		113	178	91·1	89·0
In the anterior half		61	37	49·2	18·5
In the right half		80	102	64·5	51·0
In the left half		88	120	71·0	60·0
Right hind	Total	74	92	59·7	46·0
	Alone	18	64	14·5	32·0
Left hind	Total	76	107	61·3	53·5
	Alone	30	83	24·2	41·5
Right fore	Total	38	22	20·6	11·0
	Alone	5	9	4·0	4·5
Left fore	Total	35	19	28·2	9·5
	Alone	6	13	4·8	6·5
Both hind	Total	36	20	29·0	10·0
	Alone	15	16	12·1	8·0

		Wall. Writer. *Post-mortem.* 124 cases.	Clinical. 200 cases.	Wall. Writer. Percentages.
Both fore	Total	12	4	9·7	2·0
	Alone	0	0	0	0
Both right	Total	29	11	23·4	5·5
	Alone	13	7	10·5	3·5
Both left	Total	23	6	18·6	3·0
	Alone	6	2	4·8	1·0
Two quarters diagonal		7	2	5·6	1·0

In the *Veterinary Record* of September 2nd, 1911, there appears an analysis of fifty consecutive cases observed by Burndred. His findings were as follows:—

Right fore.	Left fore.	Right hind.	Left hind.
3	6	23	18

The system of classification is not stated. As the figures total to fifty, it appears that all were single-quarter cases.

Methods of Segregation for Control and Eradication of Bovine Contagious Abortion.*

W. B. C. Danks, B.Sc., M.R.C.V.S.

Contagious abortion in cattle is of world-wide importance and is responsible for serious annual losses in many countries.

The disease is and will be in the future a problem which the stock farmers of Kenya Colony will have to contend with, especially those who are building up a valuable dairy herd. The incidence of contagious abortion is exceedingly high in the Colony and constitutes a serious menace to the cattle industry and in order to achieve any progress towards eradication of the disease, perseverance, patience and co-operation are essential.

By segregation is meant the separation of the infected from the non-infected in such a manner as to reduce to its minimum the possibility of the spread of the infection. For this purpose the infected herd should be isolated as far as possible from the clean herd and each should have separate attendants, milkers, routes of access to water and dipping tank, etc.; in short, they should be run as two entirely separate herds.

It may be opportune at this stage to point out the advantages and disadvantages of segregation as compared with vaccination.

It is generally recognised that up to the present time a killed vaccine has not given a satisfactory immunity and will not prevent the occurrence of the disease. Therefore, we can only, at present, recognise either a fully virulent vaccine or an attenuated vaccine. The former, which might undoubtedly give a good immunity, cannot be recommended because of the danger of artificially setting up the infection in susceptible animals. The latter may eventually prove of some value, but as far as it can be ascertained, the results are too variable to allow of any definite statement regarding its efficacy. As far as our knowledge of the disease is concerned at present, vaccination as a means of control is purely a palliative measure. It does not assist towards eradication, rather does it tend to keep the disease going as infection of the udder may result from vaccination of lactating cows with a live culture.

On the other hand, vaccination may be adopted on a farm in which the infection is widespread for heifers two or three months before being put to the bull in order to prevent abortion of the fœtus.

Segregation, on the other hand, aims at the complete eradication of the disease, and although in some cases it may appear a lengthy and tedious process, the ultimate result may in many cases repay the effort.

Before proceeding to discuss methods of segregation, which may be adaptable to conditions in Kenya, a brief résumé of some of the more important points regarding the disease is necessary.

The disease is due to a specific organism *Brucella abortus* (Bang), which invades the pregnant uterus and sets up a condition which ultimately, in susceptible cattle, causes abortion or the premature expulsion of the fœtus. Abortion may occur at any time during pregnancy, the usual period being the third and sixth month.

When abortion takes place on the pasture or in the boma or shed, these places become a dangerous source of infection to other animals. The aborted fœtus, fœtal membranes and the uterine discharges contain enormous numbers of the causal organisms.

The main routes by which infection is acquired are:—

(*a*) by ingestion of the organism from infected pastures;

(*b*) through the genital tract either at the time of service or through soiling of the external genitals;

(*c*) through the conjunctiva from infective material being splashed or flicked into the eye;

(*d*) possibly through the broken or unbroken skin.

A percentage of infected cows recover completely after abortion and do not harbour the causal organism. Others may abort only once and then carry their next calf to full time and may appear normal, but they still harbour the bacilli in the udder and associated lymph glands perhaps for some years. These constitute the carriers. A small percentage of infected cows become sterile. It is apparently uncommon in this country for a cow to abort for the second time even although the bacilli may be present in the uterus during the second and subsequent gestation periods. The carrier constitutes a grave danger to the clean susceptible cattle. Further, it has been proved that a disease, undulant fever, may be transmitted to man from drinking the milk from infected udders and this factor is becoming a matter of some importance.

After abortion has occurred the bacilli usually disappear from the genital tract within a few weeks. Occasionally the period extends beyond 60 days. In the case of the carrier the bacilli may be retained in the associated lymph glands and udder for a considerable period extending into years and at each subsequent gestation period the pregnant uterus may be reinfected, in which case the discharges are again infective.

* Colony and Protectorate of Kenya: Department of Agriculture (Division of Veterinary Research), Bulletin No. 11 of 1931.

The climatic conditions in this Colony are in general against the survival of this organism in the soil for any length of time. A period of six months or even less free from stock would in all probability ensure the safety of a portion of the pasture for the future use of a clean herd. There is no reason why bullocks should not graze on this portion during this period, as they are not susceptible to the disease.

One of the most important points in connection with the disease is that viable calves born of infected mothers may be used to build up a clean herd.

Viable calves born of infected mothers may give a positive reaction to a serological test at birth. If they continue to suckle the milk from infected udders this reaction may continue up to the time of weaning. However, if they are removed at birth and hand-fed on clean milk or after weaning, the reaction disappears within a few weeks. Should they then be reared on clean ground away from any infective source they give no evidence of *Brucella abortus* infection when they are bred.

The best method at our disposal by which the cattle are divided into infected and non-infected herds is the agglutination test and when contagious abortion is suspected on a farm a whole herd test should be arranged.

Serological tests of samples of blood must be practised concurrently with segregation in order to obtain the best results. Although the agglutination test is not infallible, it is of sufficient accuracy to be of great practical use in conjunction with methods of segregation in eradicating the disease. Samples of blood should be submitted at regular intervals and when possible they should be taken a short time before and after calving as many suspects may be identified at this period.

It is not possible to deal with the various factors which may affect the general scheme on different farms and it is hoped that the general ideas can be adapted to suit the individual. The methods which will be discussed will, therefore, deal with the disease on farms where the incidence of contagious abortion is low, medium or high.

Method 1.—When the incidence of the disease is low as shown from the result of a whole herd serological test, it is better to dispose of the few infected animals unless their value prohibits this course. The remaining cattle which have given a negative serological test should be moved to fresh pasture and bomas away from any possible infected area. The infected pasture and bomas should be left unoccupied or used to graze a bullock herd for a period of about six months before being restocked with susceptible animals.

In order to minimise the risk of spreading the infection, samples of blood for test should be submitted every two or three months or even shorter intervals. By this means an animal incubating the disease and giving a negative or doubtful result to the first test may be detected before she aborts. Further, a temporary calving or maternity shed, capable of being thoroughly disinfected, should be erected at a suitable place in which cows about to calve should be placed. Alternatively a temporary maternity shed which, if necessary, may be burned and rebuilt elsewhere could be erected. This is useful in that carriers which would carry their calves to full time would probably be detected at this period as previously mentioned. (This would require the recording of services, a practice already carried out on many dairy farms.) If samples of sera from the cow so isolated proved to be positive she could be syringed out daily for a short time with some mild disinfectant and then disposed of or moved to the dirty herd. The shed would then be thoroughly disinfected with a strong disinfectant or burnt.

When the cattle had given at least three consecutive negative reactions at intervals of three months, the herd could then be considered as free from contagious abortion. Precautions should then be taken to ensure that the disease was not reintroduced through any new purchases.

The calves from infected mothers and any infected cows which are too valuable to dispose of could be treated as in method 2.

Method 2.—This method would be applicable to a herd in which the incidence of the disease is too high to allow of method 1 being practicable and not high enough to warrant the whole herd being considered as an infected one. It is essentially a two-herd method in which each herd is considered as an entirely separate unit with its own attendants, pastures, bomas, etc.

When the result of the whole herd serological test is known, the positive reactors are retained on the portion of the pasture in use at the time and the remainder (non-reactors) moved to a possible clean portion of the farm.

A different watering place should be provided, if possible, for each herd and different routes of access to the dipping tank, the clean herd to be dipped first before the approach of the infected herd.

Samples of blood should be submitted every two to three months from the non-reactors and each cow as she is due to calf should be isolated in a temporary calving shed until the result of the samples of blood, which should be submitted at this time, is known. Should the result be negative then no further action is necessary, although it is always advisable to disinfect the calving shed after each calving. Should the result be positive, then it is necessary to remove the cow to the dirty herd after douching with a mild antiseptic and the calving shed must be thoroughly disinfected or burnt as the case may be.

The calves from the infected mothers should, if possible, be removed and hand-fed on clean milk, but if this is impracticable, they can be isolated for a period after weaning, tested, and if negative, sent to the clean herd.

The infected breeding herd will in the course of time be dispensed with and, bearing in mind the advisability of leaving the infected pasture free for six months or grazing it with bullocks, the owner will in all probability after a few years be left with a contagious abortion-free herd.

Method 3.—If the infection on a particular farm is so widespread as to render immediate segregation into a clean and infected herd non-practicable, the whole could be at the commencement considered as an infected herd. The disease would then be allowed to run its natural course amongst the mature breeding stock.

A small portion of the farm capable of being at a later date added to should be kept for the nucleus of a clean herd. This clean grazing must be selected at a site with its own access to water and dipping tank.

The nucleus of the future clean herd would consist of the heifers which have not reached breeding age and weaned calves which after a short period of segregation have given one negative reaction to the agglutination test.

The future clean herd would be then built up from the calves and the procedure adopted as in method 2.

The grazing adjacent to the clean pasture would have to be cleaned to allow of extension of this clean pasture to accommodate the increasing abortion-free herd. This could in most cases be done by simply anticipating the requirements and leaving this free of susceptible stock or grazing it with bullocks for the necessary period.

The bull is an important factor in all three methods and when possible a fresh clean bull should be used on the free herd. A sample of blood should be sent every three to six months from the bull and if positive he should on no account be used for the free herd. When practicable the sheath and penis should be washed with a mild antiseptic after each service.

The success of such a means of eradicating contagious abortion from Kenya depends on the close co-operation between the farmer, the District Veterinary Officer and the Laboratory.

Factors will continually crop up which cannot be anticipated at the moment for each individual and it is only by wholesale co-operation combined with patience and the determination eventually to eradicate the disease that we can hope for any large measure of success.

A Few Conditions met with after Parturition.

T. J. Margarson, M.R.C.V.S., Stroud.

I must begin my remarks with an explanation and an apology. This is a command performance. At Hereford our worthy President stated that he was, with the approval of the meeting, going to depute some of the younger members of the Society to bring forward subjects for discussion. He later informed me that, together with two others, I was to undertake this task, and I took it that there were to be three short papers this afternoon. It was some time before I could decide upon what to write if my two friends were to be allowed their quota of the time available; in fact, as they were both better known to the South Wales members than myself, I wished to occupy a minor rôle. I ultimately decided to make a few observations on some conditions that most of us frequently meet after parturition.

Imagine my surprise, then, when I received our Secretary's convening notice, to find that I had to occupy the stage "on my own" with such a subject as I had chosen. This is my explanation of the poverty of my attempt to deal with it. Perhaps a better explanation would be that, in any case, I should have been incapable of producing anything better.

Retained Placenta.

The first condition on which I propose to touch is that of so-called retained placenta. That I should even mention this condition seems absurd—you have all considered it in all its phases so often. I would, however, like to make one or two points. The condition in the cow is particularly difficult. In dealing with it I am always guided by the general health of the animal. If she is feeding, and there is no temperature, I much prefer to leave her alone for a period varying up to nine days. My experience is that in most cases no ill effects accrue. The owner has to be treated as well as the cow, however, so I generally introduce a pessary, using, as a rule, one containing iodoform in a glycerine gelatine base. In any case the iodoform prevents the use of the cow's milk, as there is often a decided taste of it in the milk. I do not like a coco butter base as I think that the liberation from it of the disinfectant is not so uniform. To get a quicker separation of the membranes from the womb I am convinced that it is much better to introduce no antiseptic at all: I believe that, without an antiseptic, there is more rapid suppuration on the surface of the cotyledons and that therefore connections are more rapidly, or more easily, broken down.

In some cases, of course, a septicæmia sets in soon after parturition. In these cases I attempt to remove the cleansing at once. I must admit that I often fail to do so, at any rate to my own satisfaction. I introduce one or two pessaries and at the same time administer a febrifuge—my favourite being liq. ammon. acet. conc., 2 ounces.

The actual removal of the cleansing I consider a most difficult and delicate operation. One must attempt to separate each cotyledon singly, often an almost impossible task. The difficulty comes when one is reaching the horn of the womb: I often leave it at that stage and return another day, for I think that it is better to do this than to resort to actual traction, and thus leave a piece of the cleansing attached. Having removed the cleansing, I insert a pessary.

On no account do I ever wash out the womb with an antiseptic or other fluid; I believe that the introduction of a fluid weakens the wall of the womb. I also have a, perhaps crude, theory that during the process of separation of the surfaces there is a zone of defence formed on the surface of the womb. If this is washed away another has to be formed. I am convinced that, in practice at any rate, this is correct, and while I know that some will say that the stinking coffee-coloured fluid should be removed by flushing and syphoning, I do not agree with them. My method is to scoop out as much as possible with the hand: the cow generally helps by straining, and the womb helps by contraction.

As regards the condition in the mare, we all know that the placenta must be removed at once. I find that great help is procured by strong torsion of the free part of the cleansing: in fact, I generally obtain the services of an assistant to twist the cleansing as I separate it from the womb. There again, I think that flushing is not only unwise, but even dangerous.

Prolapsus Uteri.

A few points on prolapsus uteri may be noted. In the first place I may say that I have not tried slinging up the cow by the hind legs. I can quite imagine that this may assist in the return, but at the same time it is often impossible, in my district at least, to get the

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animal into a suitable shed. I think that slinging by the hind legs is unnecessary, and must be distressing to an already distressed patient. If possible, I get the assistance of one or two men, and effect a return by pushing and squeezing—often a long job, but always effective. It is essential to see that the horn of the uterus is fully reverted. If this is done (as it always should be) it is unnecessary and unwise to use a clamp: the clamp causes straining and I should imagine that if the bulk of the uterus reached the vulva it would force the clamp and do severe damage; in any case there is a totally unnecessary injury to the vulva.

Epidural anæsthesia has been mentioned as a help in cases of this condition. I cannot see anything but disadvantages accruing from its use: for one thing the cow is on the ground, which is, to my mind, a great disadvantage. It is pointed out that straining is stopped: personally, I like the cow to strain—I find that between the short periods of straining there are longer periods when the animal seems actually to assist in replacement. If, upon straining, a small portion of the womb is again forced out I find that this portion is easily replaced accompanied by more of the womb.

Milk Fever.

May I make a few remarks on the over-discussed condition of milk fever? The work done on calcium content was undoubtedly great, and I should be the last to decry such research, which may one day prove of great benefit. Perhaps in other diseases it has already done so, but as regards its use in milk fever I would relate an experience.

A client who seems to specialise in producing milk fever in his cows (as he averages two to three per annum, and has done so for the last ten years) sent for me about eighteen months ago to attend a case. I found the cow staggering, but not down. As it was early in and morning I thought "this is a chance to try calcium." I duly injected her. At lunch-time she had apparently recovered. At 6 p.m. she was down and nearly unconscious. I inflated her udder and heard nothing more of her for about six days, when a large swelling at the seat of injection was reported. Eventually a slough about as big as a tea-plate came away. The owner said to me (among other things), "You have been treating cows with milk fever for me for ten years by a good old method which has never failed. Not satisfied with that, you have taken the advice of some idiot from a book. I suppose that you are getting too lazy to pump them up. Don't come and try any of your new-fangled ideas on my cows again, or I shall buy an instrument and pump them up myself." Since then inflation has been good enough for me.

The method is uniformly successful: no ill effects occur. I never inflate the udder as hard as a football (as I have read as advice in an article): it is unnecessary, and may account for the decrease in milk production during the subsequent lactation. This has been put forward as one of the things against the bad old method of inflation. Another point said to be against inflation is that tying the teats injures them, and leaves a mark. The answer to this is, "don't tie the teats": I have never tied a teat in my life. I do not lose cows with milk fever and my experience is that tying is unnecessary. If the argument is put forward (as I have heard it) that it gives the farmer something to do to take the tapes off, or that it entails another visit, then I think that it is a very poor one.

I have now to crown these assertions with an admission. Previous to the last two months I had not lost three cows in ten years with milk fever, but during the last two months I have lost three. One had calved two days and the symptoms were those of milk fever. I inflated the udder three times, but without response. I even sank to injecting calcium. Result—death in a few hours. *Post-mortem* revealed a traumatic pleurisy and pericarditis; there was, however, no fluid in the pericardial sac. I think that death was due to a toxæmia. The other two cases appeared to be true milk fever, except that there seemed to be rather a lot of struggling. *Post-mortem* showed in each case there were rather large petechiæ practically all over the heart wall. I am of the opinion that we often get a toxæmia, either from perforation of the stomach wall or from the womb, that we misdiagnose as milk fever.

Some Other Conditions.

Loin Drop is too well known, diagnosed, and treated to need more than mentioning. I would, however, warn young practitioners especially, always to suspect that the inability to rise may be due to a fractured limb. In some cases the animal does not show any signs of pain, and so one may be misled.

Pink Milk and **Blood Clots in the Milk** can be easily dealt with. I advise that the animal be milked full handed, but not stripped. This, in the ordinary way, soon puts things right.

As regards the condition of **Teat Obstruction**—I cannot explain it, but the fact remains that in my practice obstruction in the tip of the teat is rare. Certainly I have not often been tempted to use anything more formidable than a teat syphon, and then "Hewlett's Handy Teat Bougies." This treatment is fairly often followed by good results. Use of Stinson's method and instruments has resulted in three cases of infected quarters: I have therefore abandoned it for something less drastic.

A far more frequent complaint that I meet is **Pea in the Teat.** At one time I used a bistoury caché and removed the pea, but I found either that I got immediate blocking of the teat with blood or that the wound healed so quickly that I was in the same position as when I started—that was, unless infection of the udder ensued.

I happen to reside in a county where the ideal is aspired after as far as milk production is concerned: inspections are made twice yearly by local inspectors, and quarters giving pus in any form condemn the cow. I think, therefore, that a blind quarter is better than one producing pus. My advice nearly always is to let the quarter dry up on its own accord: I am, however, interested in the experience of men who have tried the later methods of removal of the peas, and should like to hear an expression of their opinions to-day.

Another condition that I have seen but seldom, but that I know to be common in Norfolk and that may be so in other districts, is that in which the cow becomes rather unsteady on her legs, froths at the mouth a good

deal, and continuously licks the walls and floor, doing this in an excited manner. I think that this condition may be due to calcium deficiency, but I have never had the opportunity of using any of the injections recommended for this condition, though I think that good results might accrue. Inflation of the udder certainly fails. In the few cases that I have seen the animal has always recovered, but this has taken as long as a month. I should like to hear of other experiences of this condition.

Discussion.

Mr. T. J. Brain assured the meeting that both his son and he had a very high opinion of Mr. Margarson's abilities: the essayist was a very practical veterinary surgeon—as all present would have gathered from his observations that afternoon. (Hear, hear.)

He was quite in accord with Mr. Margarson's views about removing the after-birth of cows: if the cleansing could be removed easily, by all means do so, but force should never be used. Further, if the womb was washed out, antiseptics should not be used, as he was quite certain that they retarded healing, and it was far better to employ a saline injection.

With regard to prolapse of the uterus—curiously enough, when meeting Mr. Margarson at some meeting during the summer, the latter had told him that at another meeting the essayist there was saying that he immediately slung the cows. That seemed to him (Mr. Brain) to be a very serious measure and he enquired of Mr. Margarson how it was done, but their essayist of to-day seemed as ignorant about it as he was. (Laughter.) Concerning milk fever, he would say that during his lifetime there had possibly been only two specifics for the treatment of animal disease, *viz.*, potassium iodide for actinomycosis and inflation of the udder for milk fever, and while they had such a simple and successful remedy for milk fever, why go to such a process as the injection of calcium which, so far as he had read, took much longer to produce the result and which, from what he understood, was not so efficient?

There was one thing about which he should like to pick someone's brains—they knew that they obtained a very large percentage of recoveries from milk fever, but occasionally they met with an apparently simple case which did not recover: what killed the animal? The cause of milk fever had never yet been explained to him, and in his view the disease was a form of toxæmia, and that was what caused those occasional unfortunate results.

Mr. Margarson had made reference to Mr. Hudson's operation for removal of pea in the teat; he (Mr. Brain) was inclined to think at one time that it was rather clever, and the first time he tried it the operation proved very successful. On subsequent occasions, however, he found that the operation proved successful for a time, but in the course of a few weeks the teat became occluded again.

The other operation—the crucial incision at the end of the teat—was, he thought, a most successful one.

In conclusion, he desired to express his grateful thanks to Mr. Margarson for a very practical paper.

Mr. C. R. Golledge also thanked the essayist and said that he desired to say a few words about the calcium treatment of milk fever.

In his view the production of sloughs in the application of the injections was due to defective technique: there being something amiss in the way complaining practitioners carried out the treatment that led to these unfortunate results. He had not had one case of sloughing (although in one instance he had something approaching a slough), despite the fact that he injected about 200 animals with calcium during the last 18 months.

He had heard that people injected calcium and subsequently inflated the udder, but he thought if they only injected calcium, not in a stronger solution than 5 per cent., they would get good results. He injected a pint of solution on either side of the neck and gave a good rubbing afterwards to disperse it. The injection should be merely subcutaneous and not beneath the fascia. In cold weather he covered the site of injection with sacking to improve the circulation at that part.

He had gained clients by using calcium treatment as opposed to other people who, apparently, were afraid that they would lose them by its adoption. He could call to mind two recent instances in which farmers, hitherto in the habit of pumping up their own milk-fevered animals, had called him in to these cases because of the calcium treatment he gave. The occasional deaths from milk fever of which they had heard that afternoon were certainly very unfortunate: personally he thought they were due to meningitis.

With regard to "pea in the teat," he agreed with Mr. Margarson that it was best to leave this condition alone.

He would be glad to hear from Mr. Brain what was the strength of the saline solution he used for the uterus, because he (the speaker) was opposed to the flushing out of that organ: he presumed that it was normal saline solution that was used.

He desired to say a few words about prolapsus uteri. Mr. Margarson apparently still worked very hard in bringing about a successful termination to a nasty case. He (Mr. Golledge) did not. His introduction to a process of comparative ease in dealing with this condition was the discovery that by using a wooden window shutter or wide board he could save himself a lot of trouble. After washing the uterus and placing it in a sheet, he wedged the board up so that it was just level with the vulva, the cow being in the recumbent position. He then secured two square gate-posts and placed them on the board, so as to construct a three-sided box, with the uterus in the middle, the posts being nailed to the board so that they could not slide outwards. He then sat by and watched the farm hands press firmly downwards (making a fourth and compressing side to the box) and after three-quarters-of-an-hour or so the womb would be reduced in size and could be replaced without very much difficulty. Now, however, he had made a three-sided box, with one adjustable side, to take the place of the somewhat primitive affair with which he started. This procedure saved a lot of work.

Only once had he slung a cow by the hind legs to replace the womb and when the animal was in a shed that was helpful, but when the cow lay out in a field he resorted to the use of two or three large sacks of sawdust and rolled the hind part of the animal on to them: this greatly facilitated the return of the prolapse.

Mr. E. P. Evans observed that it seemed that appreciation of the cure of milk fever by inflation of the udder appeared to be dwindling, yet he might say that he had not lost a cow from the disease, provided she was healthy beforehand, and he invariably inflated with oxygen. There were, however, proper and improper methods of inflation, and it was a mistake to pump the udder up too hard.

In healthy animals he had never found the process fail, though he had had to inflate the udder of some as often as four times, and in his view any cow that succumbed was the subject of some pre-existent disease. An example was furnished by tuberculosis—a tuberculous cow would rally from milk fever, but was often not sufficiently strong to recover altogether.

Concerning retention of the placenta, while he did not leave it in unduly long, yet he advised his hearers never to be in a hurry—they should never pull so as to rupture the cotyledons.

With regard to the return of the prolapsed uterus, he always made a point of raising the hindquarters of the animal by means of beltings of straw. He raised her as much as he possibly could and it was surprising how easily, with careful manipulation and the application of the correct degree of pressure, the organ could be replaced.

Mr. R. W. Hall said that he was very greatly interested in Mr. Margarson's remarks on some of the after-effects of parturition, and especially in reference to the retention of the placental membranes. Removal of the retained placenta was one of the least desirable of the veterinary surgeon's duties, as he had to cope with an animal in a thoroughly unwholesome condition, with noisome fluid

evacuations from the bowels as well as the stinking fluid and solid material that came from the womb.

His view was that when the placenta was not in a highly putrefactive condition it was, generally speaking, better to leave it alone, simply disinfecting the contents of the womb as much as possible by the use of mild antiseptic solutions; the main thing in flushing out the womb was to see that as much as possible of the fluid syringed into her womb was syphoned back again. Any means of retarding putrefactive processes should be applied and in turn septicæmia would be retarded.

The insertion of antiseptic pessaries was advisable, but antiseptic pessaries that are made with an oily base were, in his opinion, of little value, as the fatty material that was mixed with antiseptic liquid floated on the top of the putrefactive contents in the womb. The pessaries should be prepared with a gelatine or a soap base which would mix with the putrid liquid contents more thoroughly than an oily base pessary possibly could. On quite a few occasions recently he had found that a cow, although down with milk fever, also retained her placenta, and in every case after inflating the udder and injecting calcium gluconate (and he did both) the placenta came away without manual interference. Was there something in retention of a placenta after a normal birth that was associated with calcium deficiency? At all events, he was going to inject calcium to see if it would help in removal of the retained placenta after a normal calving.

As regarded prolapse of the womb, the thing he did first on arrival at the case was to give two ounces of chloral hydrate in a quart of water, and whilst preparing oneself and cleansing the womb (say from ¼-½ hour), the good hypnotic effect of the drug was shown. That helped a great deal in preventing or subduing expulsive efforts on the part of the cow. In these cases the cow, in nine cases out of ten, was recumbent—then the slinging of the animal by the hind legs or packing up was helpful. Instead of pressing the womb in a box to lessen its capacity, as described by one member, he enveloped the womb in a very strong sheet or blanket and got the assistants to twist the ends of the material in opposite directions, at the same time applying hot antiseptic solution over the blanket —this helped to reduce the volume of the womb considerably and moreover, whilst this was being done, the cow had lost nearly all power of forcing against one on account of the chloral given previously.

Concerning blocked teat canal, as a means of rupturing the septum that prevented milk coming down in the teat Hudson's operation was an undoubted success for a period varying from two weeks to two to three months: then complaints came to one from the owner of the cow that less and less milk was obtainable from the quarter. Eventually it ceased and often the quarter became non-productive and atrophied.

He had practised the crucial incision teat operation with considerable success, but he had found that where the thickening at the end was of a deep character one was apt to incise beyond the sphincter, which often resulted in a permanent leaky teat.

Mr. Brain, replying to Mr. Golledge, stated that in making the saline solution for flushing out the uterus he used four ounces of salt to one gallon of water. It acted as a fine stimulant to the uterus, and if his hearers would try it he thought they would discard the use of antiseptics in its favour.

Mr. E. C. Bovett expressed his appreciation of the paper, adding that a contribution on the ailments of the cow could be relied upon to promote a good discussion.

With regard to retained placenta, he was one of those who did irrigate and also (like Mr. Brain) with a hypertonic salt solution, which promoted a uterine discharge into the body of the organ, which discharge could be syphoned out.

In connection with prolapsus uteri, he was sorry that no one had said anything about epidural anæsthesia, because that, to his mind, was the best thing they could hope to have at their command in the treatment of this condition: it reduced the time taken in returning the uterus, no matter how long the organ had been out. The first thing he did when arriving at such a case was to inject her, the dose depending on the length of the cow—an average length cow received 10 c.c. Epidural anæsthesia stopped the straining, but this dose did not put the animal down. He had never found a second dose to be necessary. The injection ballooned the vagina enormously, so that one had a large, empty passage into which to push back the uterus. One had only to wash the uterus, compress it (he, too, twisted it, but had one man on each side and one at the back), then unroll it at will and push it in. He used no truss or clamp. If the cow went down he did not mind very much, because one could easily raise the hind quarters or put her head downhill.

With regard to milk fever, he, of course, was a "calcium fiend"—(laughter)—and was not likely to depart from it unless he did so on the ground of expense. They might have to inject a second time, when one would give one ounce. He could not agree with Mr. Brain that it took a long time to act: he thought the drug was very rapid in its action, and it would often stop a cow from going down.

Sloughing he had experienced, but it had had no unfavourable effect upon the client; in fact, they continued to like the injection of calcium.

He believed that inflation of the udder did retard the milk supply for a while.

Mr. Bovett proceeded to give instances of the achievement of good results by the injection of calcium in milk fever, notably one in which a Mid-Somerset championship milk yield cup-winner, which had won the cup twice, was enabled to win it three time in succession (*i.e.*, outright) by a calcium injection recovery from milk fever which was obtained without any serious diminution in the milk yield. His opinion was that if that cow had been inflated she would not have won the competition, as she was affected with milk fever only three weeks before entering for the competition.

Mr. Golledge had expressed the view that cases which relapsed after treatment and died were cases of meningitis: he (Mr. Bovett) would prefer to say that they were cases of apoplexy.

Teat obstructions, as they knew, were always a nuisance, but he desired to bring to their notice an American instrument which he believed to be very useful. It consisted of two rollers which, when passed down over the teat, pressed the pea out past the sphincter. At the Taunton meeting of the Western Counties Division the previous day, Captain Motton had told him that he used the two parts of the Hudson instrument as rollers, and they answered the purpose admirably—the pea came out all right. He (Captain Motton) was so pleased that he was now going to get the American instrument,

Mr. F. C. Hobbs, having added his quota of thanks to Mr. Margarson for his valuable paper, said that he had in mind three cases in which animals did not rise after milk fever. The first died suddenly and he found wire touching the heart through diaphragm. The second did not respond to inflation of oxygen at all, and it was a very difficult task to keep her in her natural recumbent position. She was slaughtered and the membranes of the brain were very congested. No. 3 was down in an orchard, and they made a tent over her with hurdles and a rick sheet. Near the position was a deep grip. After about five days she was slaughtered and a fractured spine was found.

He had, on one occasion, to attend a cow in the middle of the night, and when he arrived, with horse and trap, soaked to the skin, his feelings were somewhat irritable; to add to that he discovered that he had only sufficient oxygen to inflate one quarter. This he did and the animal recovered in the normal way, being on her legs next day.

Mr. Hobbs recounted another case which he encountered in the early period of the new treatment for milk fever. It was his practice to take with him a quart bottle of boiled water, half-an-ounce of pot. iodide and a milk fever syringe, and he was fully equipped for the case. On returning home he used to sterilise for the next case, but on this occasion he did not, and on opening the box a week later he found the pot. iodide there—it had

not been used and his patient had recovered with only one injection of boiled water.

With regard to the amount of salt used, when mare foaling was very frequent he used to take a good handful of common salt to an ordinary milk bucket of warm water.

He always syringed a cow after removing the afterbirth and withdrew as much fluid as possible. This had always been his practice and he had no regrets, for he could not say that he had lost a single animal from doing so.

He much preferred the pig bench and plenty of bundles of straw for raising the cow's hind limbs in cases of eversion of the uterus.

Mr. B. H. Gale stated that those cases of eversion of the uterus that gave him most trouble were in heifers and cows that had aborted. The uterus in such cases was not large but it was very hard and difficult to get back into its normal position and if anyone could tell him how best to deal with these cases he would be obliged. He would also be glad to hear something from anyone who had experienced cases of necrosis of the gastrocnemius tendon—a condition he had encountered in quite a number of cases as a sequel to milk fever. Cases of pea in the teat and similar conditions he left severely alone: that might be a great mistake, but it saved a great deal of bother.

Mr. J. H. Stewart said that, as a rule, when the question of removing the placenta was raised it was passed over as a simple matter, but it was a very filthy operation and often entailed considerable work. He was one of those who advocated removal of the cleansing at the earliest possible moment, within reason. If the cow were healthy he generally left the cleansing for about three days: in such a cow one could practically always remove it on the third day, and the number of cows in which it could be done even earlier was surprising.

At one time he used to take milk fever cases and cures as a matter of course: he used to blow them up and leave them, but since the War for some reason they met with a number of irregular forms, and one often had to return in six hours and inflate them again. In his experience calcium treatment had acted satisfactorily, but no more satisfactorily than the inflation treatment, and on the whole he much preferred inflation of the udder with oxygen. His experience was that milk fever cases occurred for the most part in cows that had calved and cleansed normally. Milk fever might occur before, during, or after calving; the longest period after calving he had experienced was six months. The cow was an old Jersey, and she was an absolutely typical case from a clinical point of view. She recovered, and was up in five hours, and there was no recurrence.

He did not see why one should trouble about epidural anæsthesia when returning an everted womb. That was all right in a country gentleman's establishment, where everything was clean and fit for a surgical operation, but on the ordinary farm he preferred drenching with chloral hydrate and oil.

He never left, after the operation, without putting on a clamp.

Mr. R. W. Hall thought that the inability of cows to rise after milk fever was not always due to injury to the spine or to some disease unsuspected, but often to joints of the limbs causing acute arthritis. This caused the animal such pain that she absolutely refused to make an effort to rise.

A Member enquired if Mr. Margarson had tried chloroform in cases of prolapsus uteri. He had had several cases of prolapse when the cows were comatose through milk fever and he had had no trouble in returning the womb. Therefore, he argued, the use of an anæsthetic which would produce the same comatose effect should make the return of the uterus quite easy.

Mr. C. E. Perry (Hon. Secretary) said that, first of all, he must thank Mr. Margarson for "coming up to scratch"—the only one out of the three prospective essayists to do so—for it certainly relieved him a great deal to have his assurance that this paper, at least, would be given. (Hear, hear.)

With regard to retention of the placenta, he agreed with Mr. Stewart that it should be left alone for three days and even then, if it did not come away easily, it should be left for a little longer. Concerning after-treatment, years ago he used to syringe the cow out with antiseptics, but he did get some metritis afterwards with heaving and straining. For many years now, therefore, he had been using pessaries and with much better results. As for Mr. Brain's doctrine of flushing out the womb with saline solution, if one used anything at all that was undoubtedly the best agent. He might mention, however, that some experienced practitioners used very hot water and found that the cleansing practically came away by itself. The cow would stand it: it would not hurt her.

As regarded milk fever, he was sticking to inflation, but he was using the calcium injection as well, because he thought that calcium had a wonderful effect on the cow. He had never had a cow go down a second time after using calcium and inflation together. However, he had a fair percentage of losses from milk fever, and he always made a *post-mortem*. In every case the cow had either been full of tuberculosis or else there had been acute inflammation of the womb, and he really thought that the condition of the womb was the central factor in the causation of milk fever.

He must say that he had been most successful in the treatment of blocked teats of all three types. First, the teat blocked by a membrane across the base of the teat; with Hudson's instrument he got very good results indeed, and as regards recurrence he had had one case recur three years following but that was after the cow had been dry for some time and had calved again. However, if the operator would give the instrument a good pull down the womb would not heal up for a considerable time and the teat duct would remain patent.

As for the second cause of obstruction—pea in the teat—Hudson's instrument had often removed it for him, but he believed that the new American instrument mentioned by Mr. Bovett would be a good deal more effective.

Stinson's operation at the tip of the teat, for the relief of the third cause of duct obstruction, was a wonderful one: a cow's milk could be saved thereby. With an ordinary lance (which they could use quite well for the purpose) they must, however, be careful, or a leaky teat would follow.

Concerning the duration of the period of recurrence of milk fever after an initial attack—he had an authentic case of milk fever which he treated on Christmas Day. She recovered and went on all right to June 24th (exactly six months afterwards) when the cow went down in the field. He injected her again and she made a fine recovery.

Mr. Brain referred to the use of iodoform pessaries after removal of the cleansing, as recommended by a writer in a recent issue of the *Veterinary Record*. A doctor had told his (Mr. Brain's) son, however, that iodoform was not a suitable drug for the uterus.

Mr. R. W. Hall was puzzled to know how the insertion of a cutting instrument up the teat canal could remove all types of "pea" from the teat canal inasmuch as some of these growths were situated under the lining of the teat canal and could not in consequence be touched by the instrument.

In regard to slinging a cow by the hind quarters, he had found on two occasions that after elevating the hind quarters to a certain height the animal would regurgitate her food, and before he could let her down to normal position she had suffocated owing to the food gaining entrance to the trachea. That was one of the mishaps one had to be on guard against on slinging a cow by the hind legs.

The President (Mr. R. Moore) observed that they had had a very interesting paper and discussion, and he desired to express his warm thanks to Mr. Margarson for his contribution. (Applause.)

He was thankful to say that he was not now worried with those conditions met after parturition, though it was not always so, and he remembered that in those old days he found it handy to sling a cow with a prolapsed uterus. Regarding flushing the uterus, an old friend of his

always used chloride of zinc 1-500, and he used to say that it was remarkably good.

He now had pleasure in calling upon Mr. Margarson to reply to the discussion.

The Reply.

Mr. T. J. Margarson first thanked the members for the cordial reception given to his paper, and expressed the hope that the discussion had been as helpful to them as it undoubtedly would be to him.

He definitely did not believe that it was a good thing to introduce fluid of any description into the womb in a case of retained placenta. He must admit that he had not tried normal saline, but he did not feel tempted to do so.

In reference to Mr. Brain's remarks concerning the use of iodoform in the womb, veterinarians were perhaps dealing with a different condition from that prevailing in the human subject. In humans the case was not generally allowed to get to the stage where there was a very acute inflammation, and he was quite sure that in veterinary cases iodoform was a most useful drug.

As regarded Hudson's instrument for the removal of pea in the teat, he had never tried it, but after hearing that afternoon of some of the results achieved, he would be tempted to do so.

Mr. Golledge had expressed the opinion that sloughing accompanying calcium injection might be due to defective technique. He (Mr. Margarson) did not think the technique was particularly difficult, but he hesitated to use calcium because he was afraid that he might lose clients thereby. As for the wooden apparatus employed by Mr. Golledge, he should think he must be a very good carpenter. (Laughter.)

Mr. Evans had said that he had not lost a case of milk fever, but his (the speaker's) experience was more comparable to that of Mr. Stewart. Up to two years ago he took it almost as a matter of course that cows would rise when pumped up, but since then he had lost some cases and was not quite so confident as he used to be; he thought, however, that in these cases they were not dealing with milk fever at all, but with some other condition.

He was not greatly impressed with the idea of injecting calcium for retained placenta. In prolapsus uteri, he had certainly thought that in some cases epidural anæsthesia might be useful, but he had not realised that the injection could be judged to such a nicety that the animal could be anæsthetised without going down—that might encourage him to use it more often. His view was, however, that if there were anæsthesia of any sort or degree the womb tended to lose its tone; it became flabby and that might even be a disadvantage, for when an animal was straining it showed that there was still some sensitiveness attached to the organ and, after replacement, it was more inclined to resume its normal state quickly.

Mr. Hobbs had certainly interested him by his statement that he had achieved good results in milk fever by inflating one quarter only.

Concerning Mr. Gale's enquiries as regarded eversion of the womb in heifers, he did not quite know why, having got the womb into the vagina again, he should fail to revert it into its normal position.

He quite agreed with Mr. Stewart that milk fever generally followed upon normal parturition and normal cleansing: he seldom met with a case of milk fever where there was retention of the placenta.

Concerning Mr. Perry's remarks as to the use of very hot water in bringing away retained placenta, he had heard it suggested that very hot water should be poured on to the womb in cases of prolapse. He had never tried it, but thought that in some cases it might be useful; in fact, it was, he believed, a common practice in some districts.

The Automobile Association is defending numerous summonses against motorists in various parts of the country for the technical offence of driving with an *unsigned* licence. This is a definite offence punishable by a fine of £5.

Clinical and Case Reports.

Some Interesting Equine Cases.*

W. Hughes, M.R.C.V.S., Caerwys.

Case 1.—Aneurism of the Anterior Aorta.

Many years ago a very high-spirited carriage mare, one of a pair, developed rather suddenly a tendency to roar on slight exercise. Her gait would become unsteady; in fact, she would have fallen if not prevented: 30 or 40 yards exercise was sufficient for all the symptoms to be shown. My principal, the late Mr. T. R. Williams, had never met a similar case, and after examining the mare decided to ask the owner's permission to tube her. He went to the house to prepare for the operation and whilst I was in the saddle room close by with the coachman, we heard an unusual noise in the box. On going into the stable we found the mare on the floor struggling, and gasping for breath. I quickly sent the man to the house for Mr. Williams, but the mare was dead before he arrived, in less than five minutes' time.

We immediately made a *post-mortem* and found a large aneurism in the anterior aorta, stretching the inferior laryngeal nerve which goes to supply the larynx. Since that time I have met about a dozen similar cases all with the same history; I have tubed them with complete success and all symptoms have disappeared. Unfortunately I have never had an opportunity of making a *post-mortem* on any one of them, as their owners have passed them on. One case, I know, went on well and did good service for at least six months before changing hands.

Case 2.—Tuberculosis.

A chestnut hunter, 16·2½ hands high, bought in Pembrokeshire as a four-year-old, had a slight touch of strangles, which, however, passed off in due course leaving him perfectly sound in his wind. At six years old he made a slight whistle in his gallop and started to waste, in spite of a very generous diet, which included one cwt. of oats, with bran, split peas and some mollasine weekly. He did his work well that season and never tired, but at times he had a cough. He never had a temperature, and never refused a feed; in fact, I believe he would have eaten double the ration. Professor Hobday saw him and advised stripping the ventricle of the larynx and this was done.

He did well that summer and came up big and fat. As soon as he started work again, the same symptoms recurred, but still there was no temperature. There was often now a nasty discharge from his right nostril after coughing. Periods of great thirst came on, but these could always be controlled with iodine. At this time I had to stop riding him as he soon got distressed. In a way he was a puzzle. There was no temperature, the appetite was good (if anything abnormal) and he was in good spirits so long as no exertion was required. I often

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* Presented to the North Wales Division, N.V.M.A., at Wrexham, July 24th, 1931. Received for publication, October 22nd.

had thoughts of tubercle or glanders but the absence of temperature and of submaxillary swellings put me off the idea of testing him. Perhaps also I did not wish it confirmed as he was my own horse. In the end I sent him to the kennels and on *post-mortem* found the left lung perfectly sound, but about a quarter of the right one was a solid mass. The late Dr. Glynn, Liverpool, who examined it, pronounced it to be tuberculous.

Cases 3 and 4.—Heart Disease?

I once stopped working an aged hunter on account of an irregular heart beat, telling my client that he was not safe to ride. He was turned out for two years, when another client had the offer of the horse on condition that I passed him as safe. Now I knew what to look for, and looked pretty carefully. On examining the heart in the stable (before taking him out) to my surprise I could not detect anything amiss. A saddle was put on him and I took him into a big park and galloped him practically to a standstill, being determined to find something, but nothing happened. I informed my client accordingly, but still left myself the back door open, having regard to my opinion of him two years previously. However, the second client decided to risk it and purchased him. A fortnight later the horse dropped dead whilst out hunting, walking down a pathway in a wood, his rider (a lady) only just escaping from being thrown against a wall. Why did not he drop dead with me when I did my best to make him do it? A *post-mortem* did not tell us much—the heart was enlarged with slight thickening of the auriculo-ventricular valves. Had the two years' rest any influence in masking the symptoms? I knew what to look for and consequently was extra careful, but I missed it.

On October 28th last year I was called in to see a hunter gelding, seven years old, which was losing condition and was sluggish in his work. He had been bought two months previously and came with a great reputation: he had been examined, and passed sound.

On taking his pulse his heart was found to be irregular—missing one, sometimes two, beats in every three. On examining the heart the impulse of the first sound was strong, but the second was distinctly weaker, and if the horse was kept quiet the heart would go on indefinitely as stated above. The jugular pulse was very marked, and one could count the heart beats just as surely as by the heart itself, without making a single mistake. I gave another and guarded diagnosis after the first examination as the animal had cost a lot of money, but I left word that he was not to be hunted by anyone until he was seen again. He was seen on November 5th, when it was obvious that he had lost flesh: otherwise there was no change. The owner, an army officer, was present, and I informed him that I was inclined to the opinion that it was organic (valve) trouble of some sort, but that I would give him a gallop in a week's time. This was done on November 10th. I am only a fly-weight, 130 lb.: this horse was up to 14 stone 7 lb., so that I was nothing on his back. I must say that I was disappointed with the ride, as I fully expected him to show signs of distress fairly early, but he did not do so until I had gone four times around a 12-acre field: then he gave me the impression that something was amiss, but there was no actual distress. He was put in to cool, and it was over three-quarters of an hour before respirations became normal. I then gave a definite opinion against him and told the owner that he would never ride him with my consent. I also advised that Mr. Henry Sumner should be called in, as his great experience might help us.

Mr. Sumner saw him with us on November 27th and, like myself, could hear no definite murmurs, but my son said that he had heard murmurs, so we blamed our less acute hearing. Mr. Sumner was inclined to the opinion that it was muscular trouble and advised throwing him up for the winter and treating him with tonics, cod-liver oil, etc. This was done, but there was no improvement, so he was sent to the kennels on June 11th and destroyed. My son and myself examined his heart very carefully and the only change we could detect was a decided shortening and thickening of the tricuspid valve; we could find nothing else abnormal.

Case 5.—Fore Pastern Lameness with Puzzling Features.

A thoroughbred mare, six years old, was hurt in the near fore pastern whilst out hunting on a Saturday. It looked like a puncture from a blackthorn and the horse was rather sore on it. Antiphlogistine was applied the same night and on the following day the animal was much better. On the Monday she was sound and was exercised. She was hunted on the Tuesday and went as well as usual. On Wednesday and Thursday the mare was exercised in the mornings but on the Thursday afternoon she was found in the box holding her leg up, sweating and in great pain. On examination she was discovered to have a temperature of 105° F., her pulse was very quick (80) and her breathing in the neighbourhood of 40 to the minute. That was a couple of hours after she was first found. She would not put any weight on the foot: fractured pastern was suspected, but I could not confirm this. Again, in every other case of fractured pastern I had seen there had been nothing like the constitutional disturbance this mare was showing, so I formed the opinion that it was a case of localised poisoning following on the so-called (as I imagined it) puncture on the previous Saturday.

Treatment consisted of slings, fomentations and antiphlogistine. In a fortnight's time a pointing appeared on the outside of the pastern on the spot we suspected in the first instance. I was now feeling very happy, naturally thinking that when the abscess was opened the culprit would be found and removed; instead I had a shock. All that came out was a small quantity of semi-gelatinous material, which puzzled me. Nothing else was evacuated and the operation wound soon healed up—but my opinion was changed. That did not matter, however: there was no client to consider, as the mare was my own, but as she was rather a valuable one I decided to carry on. It was at least six months before she started to put any weight on the foot. She was needle-fired and blistered, then turned out for a year (a very large callus appeared right round the pastern about the third month) after which she was brought in. She has since done five or six seasons' hunting—but she has never regained the elasticity she had previous to the accident, which is too much to expect. At the same time, she has well paid for the care and trouble spent upon her and is still going well.

Case 6.—The Tale of a Hook in Parturition.

We were called to a foaling case last spring in a cart mare of 16·1 hands. Both forelegs of the foal were presented in the passage, but there was not a sign of the head or any portion of the neck. One foreleg was removed by the Danish embryotome but still nothing could be felt. Traction was put on the remaining leg, when something was felt which we took to be some part of the head or neck. A large scissors hook was attached with a good hold. Two men were put on to apply traction, as one was no use. Then an ear was secured by a small scissors hook and slight traction applied to that. After some time the jaw was found and roped, after which it did not take long to put the head straight.

I suggested to my son that we should now take off the scissors hooks. The small one presented no difficulty, but we could not find the big one. At the time we did not worry, as we had it secured by a rope.

We then proceeded to deliver the mare. The head came first, but no hook, then the neck came but still no hook. Then we started to worry, but the foal had to come away. After that happened we found our hook, but where do you think? Attached securely to the stifle joint: we had not a doubt that that hook had been our sheet anchor and was the means of bringing the head to our hands. I do not think, however, that we would have gone on pulling if we had known to where it was fastened. The mare did well.

Case 7.—A Supernumerary Limb.

Last spring a cart foal was born with five legs, the fifth being attached on the inside of the limb, below the knee to the small metacarpal bone, and then by skin right down to the hoof—making a perfectly formed leg and foot, just half the size of the normal one.

We decided to experiment, and as the foal was only about 16 hours old, I did not risk chloroform, but injected a few drops of "Wyley's Anæsthene" at different points. I then removed the odd member by the Danish embryotome, I thinking, at the time, what a queer instrument it was to use on the live subject. After cleansing the wound the edges were brought together and sutured. A stiff cardboard splint was applied over the dressings and bandaged on as he was somewhat weak on that leg. He did well.

Case 8.—A "Throwing" Tragedy.

Three or four years ago Professor Hobday came down to operate on a hunter, performing a laryngeal operation. The animal in question was 7 or 8 years old, with a very nice temper, in fact, so kindly was he that he was called "Manners." Hobbles were put on and he went down beautifully—you could not have wished a horse to go down better. When he went on his side he gave one struggle and only one, when the connecting link (the one to the master hobble) snapped. He was thus loose and all the hobbles fell away. Naturally we expected him to get up, but no. When I remarked "what a strange thing," his owner said "not at all, I can do anything with him." The hobbles were replaced as he lay on the ground.

Professor Hobday got his seat of operation prepared and chloroformed the horse. The operation was performed, the mask was taken off and then the hobbles removed. But by this time I had got suspicious that something was amiss: his manners were much too perfect to suit me. Cold water was applied to his head, but it was of no use. The animal could not get up and in a short time a swelling appeared just behind the withers. He was shot straight away and *post-mortem* revealed fracture through the dorsal vertebræ extending through the articulations of the ribs. No disease of the bone could be detected.

Case 9.—Rupture of the Pericardium.

A hunter was bought by a lady, who had it examined and passed sound on a Friday. The next day we held our opening meet, therefore she rode him. Towards the end of a sharp run he begun to show signs of distress, so was pulled up and taken with difficulty to his stable, which fortunately happened to be only half-a-mile away. By the time I got to him (less than half-an-hour later) he was dead. A *post-mortem* was made next day, when rupture of the pericardium was found to have been the cause of death. The heart otherwise appeared normal.

Case 10.—Cervical Fracture, with Recovery.

On March 22nd, 1930, a thoroughbred hunter mare had a bad fall out hunting through catching her forelegs in hidden wire in a fence. She fell on to her head and turned completely over; for some time she lay on the ground, and when she got up her gait was very uncertain. She was led into a stable a quarter of a mile distant, and when I arrived, an hour or so later, she was being supported on both sides by grooms, with her head towards the aisle, looking very dull and stupid.

On examining the neck a bi-lateral swelling was detected. There seemed to be loss of power on the near foreleg. As there were no available means of slinging her in the stable, she had to be removed to a box about 30 yards away. She was helped by men each side supporting her with a rug under the chest. At every step the near foreleg had to be brought forward; only then could she put weight upon it. When she got out of the stable into the yard, she went down, but to my surprise staggered to her feet without help. She was put in slings and kept quiet.

Treatment consisted of fomentations and liniment applied to the neck and shoulder. In three weeks I ventured to take her out of slings, turned her quietly round and outside into the yard and back again. This was done once daily for a week, when I then had her taken into a field near by and exercised. Her gait was rather unsteady, the near foreleg tripping very often. The mare improved daily and, as there were no facilities for slinging at her home, I kept her where she was until quite satisfied that she could do without them. On April 20th she travelled home (a distance of three miles) in the early morning and was put into a big box. She could not then reach the floor to pick up any food, so we could not turn her out. A callus was showing on both sides of the neck, in two places each side but more pronounced on the near side, showing that anchylosis of the vertebræ was taking place. In due course she was turned out, but had great difficulty in reaching the grass—for some time she had to stretch her off-fore well out in front.

As time went on she improved and then the question arose whether she would be safe to hunt again. I would not give a definite opinion until I had ridden her with hounds, as I was afraid that her balance would be upset and that she would give one a fall in jumping. I soon

found out that the mare was going to be as good as ever. She went through last season without a mistake, hunting three days—long days—a fortnight. Some little time before the end of the season I noticed her one day at the covert-side leaning over—or, rather, her hind-quarters were leaning to the near-side: you would almost imagine she was going to fall over. At the end of the season she was turned out and in May I was sent for to decide whether it was advisable to send her to the stud—I strongly advised against it, as that day she was again leaning over very badly to the near-side. She had one foal when six years old and is now 18. I saw the mare yesterday and there is no suspicion of leaning over, nor has there been for some time; in fact, you would not know that there had been anything wrong with her and she certainly looks fit for another season's hunting. The callus, of course, is still present and can easily be detected. On hunting days a patch of sweat used to appear on the near side of the neck, and it was a puzzle to know what was the cause.

The vertebræ were certainly fractured, but not displaced, although pressure on the cord to a small extent was present. At her age, I look upon it as a wonderful recovery. An attempt at treatment would never have been made but for her value as a hunter, she being certainly in Class one.

Case 11.—Foxglove Poisoning.

Last Monday my son was called in to attend an aged cart mare that had been found in a dazed condition in a field. On examination the pulse was found to be very slow. She was quite blind and in the same condition as a patient under a big dose of morphia. Poisoning was suspected, and a search was made in the field, when foxglove in large quantities was found, the petals and seeds shedding in the pasture—nothing else suspicious was discovered, so the condition was put down as foxglove poisoning. The mare was stomach pumped with sodii chlor. and formalin and injections of caffeine were given subcutaneously. Next day there was an improvement and, in addition, large quantities of urine were passed. The same treatment was applied on Wednesday, when I saw her myself, and then the symptoms had nearly all passed off, her vision being nearly normal.

Pasteurisation and Vitamin C in Milk.

As a result of a study of the effect of certain metals upon the destruction of vitamin C during the ærobic pasteurisation of milk, the authors found that in aluminium vessels there is a destruction of 20 to 40 per cent.; in tinned copper rather higher, and in naked copper 80 to 90 per cent. The practical importance of these experiments is that copper is again shown to be unsuited for construction of dairy equipment. So far as conservation of vitamin C is concerned, tinned copper is also objectionable. Aluminium is a satisfactory material for the construction of dairy equipment, but there is reason to suspect that block tin would not be suitable. Tin and aluminium are both pharmacologically superior to copper for use as food containers. The experiments described are not inconsistent with the theory that anærobic pasteurisation would reduce the vitamin destruction, possibly to zero, even in the case of copper. Even if this should be so it would still be desirable to secure and employ construction material with the greatest negative potentialities.—E. W. Schwartz, F. J. Murray and G. J. Cox (*J. Nutrition*, IV., 2, July, 1931, Ex. *Pharm Jour.*).

Reviews.

Report of Proceedings under the Diseases of Animals Acts for the Year 1930.

The annual report of the Chief Veterinary Officer of the Ministry of Agriculture and Fisheries is now available. Copies may be obtained from H.M. Stationery Office or through any bookseller. Price 2s. 2d. post free.

The contents, which supply much information of interest regarding the various notifiable diseases and also indicate the amendments to existing regulations which have been enacted during the year, will naturally prove of most interest to those members of the profession who are engaged in the public services.

The report records the continued freedom of Great Britain from cattle-plague, glanders, contagious pleuro-pneumonia, rabies, sheep-pox and equine epizootic lymphangitis. It also supplies statistics and other information regarding the six other notifiable diseases of animals, namely, foot-and-mouth disease, bovine tuberculosis, anthrax, swine fever, sheep-scab and mange of equines, and indicates that, with the exception of bovine tuberculosis, there have been reductions in the number of outbreaks of all these diseases.

The section dealing with foot-and-mouth disease contains a brief description of the serum treatment carried out by the Ministry as an ancillary to the slaughter policy. The results from the use of serum are said to be encouraging. It is, however, made clear that it is not possible to state whether the animals so dealt with would have developed disease had they received no serum. No mention is made as to whether the serum used has given satisfactory results under experimental conditions in this country.

The types of virus identified in 28 outbreaks of foot-and-mouth disease which occurred in Great Britain during the years 1927-1930 are recorded; of these 26 were typed as being virus "O," the remaining two did not correspond with any of the three recognised types known as "A," "O," or "C."

Much useful information can be derived from the section recording the results of the administration of the Tuberculosis Order. Statistics are given showing the numbers and classification of animals slaughtered as diseased, the results of the *post-mortem* examinations, and the amount of compensation paid. Comparative tables showing these details for each year from 1926 are included. During 1930, 15,463 animals were reported by veterinary inspectors of Local Authorities as coming within the scope of the Order. The percentage of milk and udder cases amongst the cows and heifers slaughtered as affected was 19·3. It is claimed that the Order has resulted in a reduction in the number of animals suffering from the grosser forms of tuberculosis and that it is gradually becoming more effective in securing the slaughter at an earlier stage than formerly of cows affected with tuberculosis of the udder.

In the section relating to swine fever it is recorded that 2,408 outbreaks were confirmed during the year—a decrease of 19 per cent. as compared with the year 1929. Investigation showed that about 50 per cent. of the outbreaks were due to market infection and it is pointed out that this factor emphasises the need for greater watchfulness over markets and sales in order that pigs showing signs of disease may be detected and dealt with.

The section also contains a reprint of a paper dealing with the survival of the virus of swine fever—a subject which is of interest in connection with administration of the Swine Fever Orders in this country.

In a chapter referring to bovine contagious abortion, the reasons why this disease is not dealt with by compulsory notification and other administrative action are briefly explained.

Part II of the report contains a review of the administration of the measures taken to prevent the introduction and spread of contagious disease in this country, and includes particulars of the animals imported from Ireland and other countries and of the diseases found in them.

Part III describes the measures for the protection of animals and poultry from unnecessary suffering during transit by land or sea, including a brief history of the events that led up to the passage of the Animals (Sea Transport) Order of 1930, and the Transit of Animals (Amendment) Order of 1930. A statement of the casualties which have occurred during transport overseas is also given.

Part IV describes the activities of the Ministry in connection with the certification of animals and animal products intended for export, to meet the requirements and regulations of the importing countries, and describes the working of the London Quarantine Station for exported pedigree stock.

Part V summarises the diagnostic work done at the Ministry's Veterinary Laboratory at Weybridge in relation to certain notifiable diseases, and records the extent of the preparation and issue of vaccine for use against contagious abortion and tuberculosis in cattle, and of the immunisation of cattle against redwater (piroplasmosis) and tristeza (anaplasmosis) before export to tropical and sub-tropical countries. This section also refers to the number of agglutination tests of poultry conducted at the Laboratory, and to the large issues of fowl-pox vaccine.

Part VI contains an account of the meeting in Paris in April, 1930, of the International Office of Contagious Diseases of Animals, and includes a brief record of the discussions on matters of major importance to Great Britain and the Empire at the Eleventh International Veterinary Congress held in London in August, 1930.

Part VII is a miscellaneous section that deals with sheep-worrying and the issue of the Control of Dogs Order of 1930, and records the progress of the campaign that is being waged by the Leathersellers' Company's Committee against the warble fly pest.

The Appendices to the report contain statistical tables of animal diseases confirmed in Great Britain during 1930, and of animals imported and exported, as well as tables showing the incidence of animal diseases in European countries during the years 1929 and 1930, and the number and breeds of stock exported with certificates issued by the Ministry during 1930. L. H.

"Veterinary Journal" Physiology Number.

The October number of the *Veterinary Journal* (1931), 87, No. 10, is devoted almost entirely to physiology and comprises a series of quite excellent reviews. Two of the articles are written by original workers paramount in the fields they describe and consequently they are both authoritative and up to date. That by Parkes on "The Co-ordination of the Reproduction Processes" deals mainly with the recent discoveries of hormones and their importance in reproduction. The article on "Stores of Blood" by Professor Barcroft is equally authoritative and describes again knowledge that has only been gained during the last few years. A. Piney contributes a short review of that very important tissue, the reticulo-endothelial system, and F. W. Lamb writes upon "The Regulation of the Acid-fast Balance of the Body." Crew, Miller and Anderson recount their successful application of the Ascheim and Zondeck test for pregnancy to the equine species and suggest that veterinary practitioners should submit urines from supposed pregnant mares to them so that advice may be given to owners as early as possible as to the success of the conception. W. P. Blount contributes a short article on "The Gall Bladder."

Altogether, this is a most interesting number.

W. R. W.

Abstracts.

[**Correlation of Occupation with Serological Reactions for Brucella abortus.** Thomsen, Axel, *Journ. Infectious Dis.*, Vol. 48, No. 5, May, 1931, pp. 484-497.]

Summary.

Two hundred and seventy-two persons whose occupations bring them into contact with cattle were examined serologically for agglutinins and complement-fixing bodies for *Br. abortus*. A preliminary check of 61 healthy persons and nonfebrile patients in other occupations showed no reactions. The results of the examination of the 272 were as follows:—

Of 65 veterinary surgeons in rural practice for more than one year, 61 (94 per cent.) showed positive reactions. The results of complement-fixation tests were far more frequently positive than those of agglutination tests.

An entire class of young veterinarians, tested before their final scholastic examinations, showed no reactions.

Another entire class, 18 in all, were examined five months after leaving school; 15 reacted with titres equal to those in cases of undulant fever. Only one had clinical undulant fever.

A third class of 12 (11 tested), examined about a year after leaving school, gave reactions correlating with those of the preceding group. Those who did not give reactions were not handling cattle.

Of 16 bacteriologists working with *Brucella*, ten gave positive reactions (63 per cent.).

Of 21 chief cattle attendants at farms where contagious abortion existed, 13 (62 per cent.) showed positive reactions.

Of 25 lesser employees in similar work at these farms, six gave positive results (24 per cent.).

Of 23 owners of such farms, nine gave positive reactions (39 per cent.).

Among 20 milkmaids at similar farms, only one showed a positive reaction.

No reactions were noted among ten milk tasters of large Copenhagen dairies.

Of five inspectors (veterinarians) of milk and stables, one gave a positive reaction. He had, however, formerly engaged in rural practice.

Five of 25 butchers were found to give positive reactions (20 per cent.).

Inspecting veterinarians at slaughterhouses showed four positive serums in 12 examined. All four had formerly practised among cattle.

Conclusions.

It would appear that the treatment and care of sick animals infected with *Br. abortus* are primarily responsible for the reactions noted in the persons observed and, presumably, for the infections. Flesh of killed animals, particularly new-born calves, would seem to be rather remotely connected, further study being indicated. Milk has no proved connection with the reactions.

Since undulant fever rarely correlates with the titre of the serum, the usual strains of *Brucella* are presumably not pathogenic for men. Yet it is unequivocal that pathogenic strains do occur, and thus vaccination is indicated for those likely to be directly exposed.

The interpretation of positive results in diagnostic serologic tests for *Brucella* among those in occupations connected with cattle or with *Brucella* should be made with care, since the serums of healthy persons thus employed may give positive reactions.

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[**On the Occurrence of Febris Undulans in Danish Veterinarians. (A Contribution to elucidate the Pathogenicity of *Bac. abortus* Bang in Man.)** Thomsen, Axel, *Maanedsskrift for Dyrlæger*. xliii. 1931.]

Summary.

From previous investigations of the author it is evident that veterinarians are far more liable to infection with *Bac. abortus* Bang than are the members of any other occupational group in close contact with domestic animals (and their products).

Up to the present, nevertheless, the diagnosis febris undulans has been made only in six cases amongst the veterinary surgeons in Denmark.

All these six patients were young veterinarians who were taken ill shortly after they had commenced practising on cattle, that is, in abortus-infected stables.

That the disease has not been ascertained amongst older veterinarians is quite in keeping with the fact reported by the author (and later confirmed by others), that nearly all veterinarians (ca. 94 per cent.) who have practised on cattle for more than one year, have specific antibodies against the *Bac. abortus* Bang—so, presumably, they are immune.

The author points out that it is a very natural measure to try out vaccination of the young veterinarians before they commence practising.

From the chronological distribution of the six cases of febris undulans observed in the veterinarians, one would expect to find a couple of cases in each class of young veterinarians that have graduated from the college.

With this possibility in view the Serum Laboratory has sent questionnaires to all the veterinarians graduated from the college during the period 1915-1928 incl.—a total of 325 veterinarians working in Denmark. 324 of these have filled in the detailed questionnaire.

In these reports were 30 more or less doubtful cases, which have been reviewed by Professor Dr. V. Bie, *who was unable to point out with any fair degree of certainty as much as a single case of febris undulans in this material.*

Considering the fact that veterinary surgeons are very much exposed to this infection and, further, that these persons are well versed in medicine, it is reasonable to regard this material as especially suitable for investigation into the question of the occurrence of febris undulans prior to the very latest years.

Therefore, presumably, it is warrantable to look upon febris undulans as a new disease in this country—a disease that was unknown prior to 1925.

The author then discusses the conclusions that may be drawn from this material, as to the pathogenicity of *Bac. abortus* Bang in man.

. . . . . .

[**Brucella Skin Eruption in Veterinary Surgeons. (A peculiar occupational skin lesion, presumably of allergic nature, produced by *Bac. abortus* Bang.)** Thomsen, Axel, *Maanedsskrift for Dyrlæger*. xlii. 1931.]

Summary.

Description is given of an occupational skin affection occurring in veterinary surgeons. It appears as an eruption on the arms and, sometimes, on the hands and fingers, consisting in multiple follicular papules, and accompanied by intense itching, pustule formation and necrosis. In severe cases the individual papules become confluent, and the entire arm is infiltrated, red and tender; now the itch is usually very intense, so that the patient is mostly incapable of work. The skin lesion is acute in its onset, developing especially in immediate connection with delivery of the afterbirth in cows with infectious abortion; and it has a tendency to relapse after every subsequent delivery. The eruption may last up to three weeks. In periods when the delivery of placenta is a frequent procedure (in particular the spring) the lesion may be "chronic." This skin lesion is rather common—nearly one-third of all the veterinarians graduated since 1915 have had one or several attacks.

The eruption may hardly be due to an actual infection of the skin with *Bac. abortus* Bang. It is probably an allergic reaction of the skin to the "toxins" of this bacillus that are presumably present in considerable amounts in the specific afterbirth exudate, being thoroughly rubbed into the skin of the veterinarian's arm under the delivery of the placenta. The presence of an allergic condition in cases may be demonstrated by a cutaneous test with a preparation produced along the lines of tuberculin preparation. It is called "abortin." Inunction of this preparation into the skin of a sensitive individual produces a reaction that looks exactly like the "spontaneous" eruption, whereas the control individuals —with a very few exceptions—have shown negative reaction. So this eruption is very likely to be interpreted as an allergic reaction; and it seems most reasonable to attribute this allergy to a preceding infection.

The skin lesion is not accompanied by fever or any other general symptoms, and it has no resemblance to Febris undulans Bang. The clinical picture observed by us differs, moreover, in some essential features from several other cases of skin eruptions described in the literature as occurring in veterinary surgeons subsequent to delivery of the afterbirth in infectious cattle abortion.

For treatment of this skin lesion protective remedies are recommended.

[**Investigations into the Motility (kinematic) of a Spavined Hock in the Horse.** Christnach, Veterinary Major Dr. *Zeitschrift für Veterinärkunde.* August, 1930.]

The articulations of the hock are four in number: (1) Tibio-tarsal; (2) tarso-metatarsal; (3) intertarsal (between different rows of tarsal bones); (4) inter-osseous (between bones in the same row).

The movements in the last three are very slight and when anchylosis of these joints has occurred in spavin the only movement possible is that of the tibio-tarsal articulation. The movements of this joint have been investigated and measured in the case of hind legs of horses which had shown unmistakable symptoms of spavin during life.

The objects of the investigations were to establish:—

1.—The angles between the tibia, the tarsus and the third metatarsal bone.
2.—The strength of the ligaments of the joint.
3.—The range of movements in the joint.
4.—The anatomical changes in the joint.

The conclusions arrived at were:—

1.—The angles of diseased hocks differ from those of healthy hocks, being either greater or smaller.
2.—The ligaments are always thickened and strengthened and in a certain number of cases show ossified areas.
3.—The range of movement is determined by a specially devised apparatus by which the degree of extension, flexion, adduction, abduction and rotation can be measured. In every case of spavin the movements in every direction are considerably decreased.
4.—The exostoses may attain such proportions that the action of the tibio-tarsal joint is impeded.

H. H.

[*A propos* **the Treatment of Open Joint.** Dauvois, Dr. (Veterinarian, Grigneville). *Recueil de Médecine Vétérinaire.* Vol. cvii, No. 9.]

While at college in 1906 the author was instructed by Professor Cadiot to treat an open fetlock joint of a light cart-horse by injecting the fistula with oil and biniodide of mercury. Finding difficulty in introducing the mixture through the point discharging synovia, with a Pravaz needle he punctured the posterior *cul de sac* of the synovial membrane between the metacarpus and the suspensory ligament and readily injected the joint, some of the oil escaping by the fistula. The escape of synovia stopped, but as a result of the irritation there was pseudo-anchylosis and the patient left the College permanently lame. Being equally unsuccessful afterwards in several similar cases with injection of various antiseptics, he abandoned this method. In July, 1929, having a case of open fetlock joint, he injected five drachms of lacto-serum (whey) into the posterior *cul de sac* of the joint synovial membrane. A rapid cure resulted and eight days later the animal was put to work. He himself and several of his confrères have had like happy experiences.

Another case is recorded in which a harrow-pin, entering the back of the pastern, perforated the flexor tendon and entered the sesamoidean sheath. The joint was not involved. Puncturing the tense synovial sac in front of the perforans, ten drachms of lacto-serum was injected through the Pravaz needle, some of the liquid escaping by the wound below. Next day an ounce of lacto-serum was injected and now none escaped by the wound and a perfect recovery resulted.

The author advises that the injection be made away from the wound as soon as possible after the injury is inflicted and repeated next day if necessary.

W. R. D.

N.V.M.A. Divisional Report.

Mid-West and South Wales V.M.A.

Meeting at Cardiff.

The Autumn Meeting of the Mid-West and South Wales Division, N.V.M.A., was held at the Queen's Hotel, Cardiff, on Friday, October 16th, 1931.

The President (Mr. R. Moore) occupied the chair, and there were also present Messrs. E. C. Bovett, T. J. Brain, G. S. Bruce, W. T. Edwards, E. P. Evans, B. H. Gale, H. C. Golledge, Captain A. F. Good, Messrs. R. W. Hall, F. C. Hobbs, T. Margarson, J. L. Perry, C. J. Pugh, D. E. Pugh, W. D. Rees, B. Sayer, E. Sayer, Captain J. H. Stewart, Mr. L. A. Watson, Captain W. R. Williams and Mr. C. E. Perry (Hon. Secretary). Mr. D. W. Menzies was present as a visitor.

Minutes.—The Hon. Secretary read the business section of the minutes of the last meeting, in view of the fact that there was some correspondence arising therefrom. The full minutes (as published in the *Veterinary Record*) were then confirmed and signed.

The Hon. Secretary observed that the first matter arising from the minutes was the resignation of Mr. Mullane. As requested at their former meeting, he had again written to Mr. Mullane and asked him to reconsider his resignation. He had received a reply (which he read) in which Mr. Mullane intimated that he could not see his way to continue in membership.

Mr. Mullane's resignation was accepted with regret.

Also arising out of the minutes, the Hon. Secretary reported that, as requested, he had sent to the N.V.M.A. the resolution passed at their last meeting relative to the prosecution of one of their members by the R.S.P.C.A.

The Secretary read the reply which had been received from the N.V.M.A., and on the proposition of Mr. W. D. Rees, seconded by Captain J. H. Stewart, it was unanimously agreed that no further action be taken.

Correspondence.

(1) From the following gentlemen, apologising for their inability to attend the meeting:—Captain J. J. Aveston, Mr. J. R. Baxter, Mr. J. C. Coleman, Major G. E. Henson, Mr. J. R. Hewer, Principal F. T. G. Hobday, Mr. A. O. McDowell, Mr. J. S. Pike and Major D. M. Storrar.

Arising from the terms of Mr. J. C. Coleman's letter, it was agreed that his expenses in connection with his visit to Margate as the delegate of the Division to the Royal Sanitary Institute's Congress, 1930, be paid forthwith.

(2) From the Secretary of the N.V.M.A., enclosing a resolution from the Midland Counties Division *re* obtaining a concensus of professional opinion as to the advisability that Johne's disease should be included in the list of compulsorily notifiable affections.

Mr. E. C. Bovett informed the meeting that that resolution had been discussed by the Western Counties Division at their meeting at Taunton the previous day. The opinion there was that the Tuberculosis Order looked like becoming a dead letter despite the compensation paid, and as notifiability in respect to Johne's disease could not be enforced without compensation, it was a most inopportune time to put forward the suggestion. In the opinion of the Western Counties Division, therefore, there was no possibility of Johne's disease being made notifiable at the present time.

Mr. T. J. Margarson agreed with Mr. Bovett as regarded his assertion that this was not an opportune time at which to press for any such measure, but he certainly challenged his assertion that the Tuberculosis Order looked like becoming a dead letter. Being an inspector in a county where the Order was being carried out as it should be—(laughter)—he could assure them that it was found there that the Order was doing a great amount of good.

Mr. Bovett replied that what he wished to point out was that it was likely that the compensation payable under the Order would be reduced, a process which was only too likely to be accompanied by a reduction in the number of notifications.

The Western Counties Division quite agreed that it was desirable that Johne's disease should be made notifiable, but were convinced that the present was not an opportune time to press for it.

On the proposition of the Hon. Secretary, seconded by Mr. Bovett, it was resolved "That this Division, while in sympathy with the suggestion that Johne's disease be made notifiable, is of opinion that the present time is not opportune for pressing the Ministry of Agriculture in this regard."

(3) From the Secretary of the N.V.M.A., enclosing copies of an article entitled "The Veterinary Profession and its Obligations to the Public," written by a well-known member of the profession. The article (said the covering letter) was being circulated to all Divisions by the "National" with the request that endeavour should be made to secure its insertion in the local press.

Several members undertook to endeavour to secure the desired insertion in local organs.

(4) From the Secretary of the N.V.M.A., enclosing documents relating to the free treatment of the sick animals of poor persons.

The meeting resolved itself into committee for the consideration of this matter, but shortly returned to open meeting, when it was proposed by Mr. W. D. Rees, seconded by the Hon. Secretary and carried unanimously "That copies of the documents be procured and circulated amongst the members of the Division; also that a special meeting of the Division (to which non-members practising in the area of the Division be invited) be called for the purpose of considering the matter, and that a representative of Council, N.V.M.A., be asked to attend the special meeting to speak to the proposals and to answer questions."

Paper.—The President now called upon Mr. T. J. Margarson to read his paper entitled "A Few Conditions met with after Parturition," the Secretary having explained that this was originally one of three short papers which had been provided for, but that Mr. Margarson was the only one of the three anticipated essayists who had "produced the goods," and the Council of the Division were correspondingly indebted to him. (Applause.)

[Mr. Margarson's paper and a report of the excellent discussion which followed its presentation, are reproduced earlier in this issue of the *Record*.—Ed.]

New Members.—On the proposition of Mr. Bovett, seconded by Mr. T. J. Margarson, Mr. D. E. Pugh, of Swansea, was unanimously elected to membership of the Division, as was also Mr. D. W. Menzies, Veterinary Advisory Officer to the University of Bristol, on the proposition of the Hon. Secretary, seconded by the President.

Votes of Thanks.—Mr. T. J. Margarson was accorded a very hearty vote of thanks for his "very interesting and practical paper," on the motion of the President, seconded by Mr. Brain, and the meeting concluded with an acknowledgment of the President's conduct in the chair.

C. E. Perry, *Hon. Secretary.*

North Wales Division.*

Meeting at Wrexham.

A meeting of this Division was held on Friday, July 24th, at the Wynnstay Hotel, Wrexham, the President, Mr. J. Cane, occupying the chair.

The following other members were present: Messrs. Cartwright, Edwards, T. W. Hughes, W. Hughes, W. O. Jones, Lewis, Dr. Montgomerie, Professor Share-Jones, Messrs. Wynne and H. V. Hughes (Hon. Secretary). The vistors were Messrs. C. W. Elam, A. E. Edwards, Dudlyke, W. Jones and McGhee. Apologies for absence were read from Principal Hobday, Messrs. H. Ll. Jones, L. Ll. Jones, Wynn Lloyd, W. T. Rowlands and Savage.

Correspondence.—(1) From Dr. Bullock, inviting the support of the Division towards the Sir Frederick Smith Memorial. It was agreed to subscribe two guineas to the fund.

(2) From the Secretary of the Victoria Veterinary Benevolent Fund, intimating that the society were entitled to elect a representative on the Council of that body. Professor Share-Jones was asked to represent the society and he agreed.

(3) From the General Secretary of the N.V.M.A., calling attention to the fact that the R.C.V.S. Council had had occasion to complain of the practice of certain members of the Association of displaying letters on their notepaper which bore no academic significance.

The President said that he was not aware that any member of the Division was concerned in the matter, but even if he were wrong he felt that it was only necessary for attention to be called to the practice for it to cease.

The President asked if any further correspondence had been received with regard to the resolution passed at an earlier meeting relating to the duties of Veterinary Advisory Officers.

*Received for publication October 22nd.

The Secretary replied that the resolutions which had been passed by the society had been sent to the N.V.M.A. and the R.C.V.S. The former body had replied expressing their approval of the terms of the resolution; the R.C.V.S. had stated that the matter was still being discussed with the N.V.M.A. and the Ministry of Agriculture.

Mr. Edwards explained the position as he saw it from the viewpoint of a member of the committee of the N.V.M.A. dealing with the matter. He said he had unfortunately not been able to attend the committee meetings, but from what he had heard he feared lest decisions on the duties of Veterinary Advisory Officers might be reached with the Ministry of Agriculture before the profession as a whole had been informed of the details.

A lengthy discussion on the subject ensued, in which Professor Share-Jones, Dr. Montgomerie, Mr. W. Hughes, Mr. Wynne and Mr. H. V. Hughes took further part. Finally, the following resolution, proposed by Mr. Edwards, was passed, and the Secretary was instructed to forward a copy to both the N.V.M.A. and the R.C.V.S. :—

"That this meeting of the North Wales Division is unanimously of opinion that, prior to any final agreement being made with the Ministry of Agriculture regarding the future of the Veterinary Advisory Scheme and the duties of Veterinary Advisory Officers, it is desirable that reports of negotiations between the joint committee of the Royal College of Veterinary Surgeons and the National Veterinary Medical Association and the Ministry of Agriculture, together with the terms of any proposed scheme, should be laid before the profession generally and published in the *Veterinary Record*."

Cinematograph Exhibition.—The President then called upon Mr. C. W. Elam, of Liverpool, to give a cinematograph exhibition. Mr. Elam, he said, was one of the pioneers in this country in applying the cinematograph to veterinary work and he hoped Mr. Elam would continue to make successful progress in that direction. Mr. Elam's films included pictures taken at the International Veterinary Congress last year—a film which would be of great historic value—and a number of shots of interesting clinical cases such as lame horses, meningitis in dogs, cattle suffering from sewage poisoning, etc. The show was much appreciated by the members and Mr. Wynne proposed and Mr. Lewis seconded a very hearty vote of thanks to Mr. Elam for his kindness in coming over and entertaining them that afternoon. Mr. Elam, in thanking the members for their appreciative attention, said he was only too pleased to demonstrate the possibilities of the cinema. He begged them to bear him in mind when they came across any peculiar or outstanding cases in the course of their practice, for he would be grateful of the opportunity of filming such cases in the interests of the students at the Liverpool School.

Paper.—The President then called upon Mr. W. Hughes, of Caerwys, to read his paper on "Some Interesting Equine Cases." Mr. Cane reminded the meeting that Mr. Hughes had been obliged to postpone the reading of his paper at the last meeting of the society. Since then he had been laid up for some time with illness and it was therefore doubly gratifying to have him with them that afternoon. (Hear, hear.)

[The account of these interesting cases given by Mr. Hughes is reproduced in our Clinical Section this week. —Ed.]

As the hour had then become late, it was obvious that the discussion would not do justice to the paper and it was agreed (Mr. Hughes having expressed his approval) to discuss the paper at the next meeting of the society, by which time it would have appeared in the *Veterinary Record.*

Professor Share-Jones passed around among the members some photographs of certain peculiar cases upon which he had recently operated at the hospital at the Liverpool School, and he agreed to write them up for publication in order that they might be discussed with the cases brought forward by Mr. Hughes. This terminated the meeting. Later, through the kindness of the President, the members were entertained to tea at the hotel. Mr. Wynne and the Secretary, on behalf of the company, expressed their gratitude to Mr. Cane for his hospitality.

H. V. Hughes, *Hon. Secretary.*

Notes and News.

The Editor will be glad to receive items of professional interest for inclusion in these columns.

Diary of Events.

Nov. 23rd.—N.V.M.A. Editorial Committee Meeting at 2 Verulam Buildings, Gray's Inn, W.C.1.

Nov. 24th.—Annual General Meeting of the Dumfries and Galloway Division, N.V.M.A., at Dumfries.

Nov. 27th.—Meeting of the Royal Counties Division, N.V.M.A., at 10, Red Lion Square, London.

Dec. 2nd.—Meeting of the Lancashire Division, N.V.M.A., at Liverpool.

Dec. 3rd.—Meeting of the Central Division, N.V.M.A., at 10, Red Lion Square, W.C.1.

Dec. 4th.—Meeting of the Southern Counties Division, N.V.M.A., at Winchester.

Animal Diseases Committee, Agricultural Research Council.

Major-General Sir John Moore, F.R.C.V.S., has been invited to become a co-opted member of the Animal Diseases Committee of the Agricultural Research Council, recently appointed by the Privy Council, and has consented to serve.

The Committee proposes to visit the Royal Veterinary College, Camden Town, on Monday next, at 11.15 a.m., to confer subsequently (in the afternoon) at the Council's offices in Dean's Yard, Westminster, and to journey by night train to Edinburgh for a visit on Tuesday to the Royal (Dick) Veterinary College and the Laboratories of the Animal Diseases Research Association, Moredun.

Proposed Electrical Slaughter Demonstration.

The slaughter of animals, both large and small, is a matter which never ceases to exercise the minds of members of the veterinary profession, beset as it is with questions as to the relative merits of rival methods, having due regard to the humanitarian and economic aspects of the problem.

For some time past we have drawn attention, in our notices column, to a demonstration which it is proposed to hold at an early date, under the auspices of the Association, of an apparatus which undoubtedly possesses merits entitling it to investigation by members of the profession. "The Gunn S.R.V. Electrolethaler"—Nos. 1 and 2, makes use of a specially-phased electrical current which induces immediate unconsciousness before the slaughtering of animals for food, while it is applicable also to the instantaneous destruction of dogs and cats and, moreover, can be modified to produce anæsthesia for minor operations.

The opportunity of witnessing a demonstration of the use of the apparatus in all these phases is one of which we hope many of our readers will take advantage, for it should not be missed if attendance is practicable at one of the London centres to be selected for the demonstration. Those interested should send in their names without further delay to the General Secretary, N.V.M.A., 2, Verulam Buildings, Gray's Inn, London, W.C.1.

We are informed that the Sheffield Health Committee has purchased and installed the first S.R.V. Electrolethaler No. 2 sold in Great Britain by the General Radiological and Surgical Apparatus Co., Ltd., London.

The apparatus has been adopted on the recommendation of their Chief Veterinary Inspector, Mr. Tweed, and he will be responsible for its operation by a member of his staff.

Model Abattoir Society.

The Tenth Annual Benjamin Ward Richardson Memorial Lecture will be delivered on Wednesday, November 25th, 1931, at 5 p.m., in the Lecture Hall of the Royal Sanitary Institute, 90, Buckingham Palace Road, S.W.1.

The lecturer will be Mr. Hal. Williams, M.I., MECH.E., etc., and his subject will be "Disease and the Public Abattoir."

Free State Veterinary Council.

PROFESSOR J. J. O'CONNOR ELECTED PRESIDENT.

"The Council which is to govern the Veterinary Profession in the Irish Free State, as provided by the Veterinary Surgeons Act, 1931, has now been appointed by the Executive Council," says the *Irish Times* of November 11th. "It consists of eight members, as follows:—

Professor Craig (Veterinary College, Ballsbridge), Messrs. J. Dodd (Sligo), P. F. Dolan (Dublin), P. J. Howard (Ennis), J. S. McCann (Tullamore), Louis Magee (Dunboyne), T. R. Mulcahy (Clonmel) and Professor J. J. O'Connor, President of the Veterinary Medical Association of Ireland.

"The members held their first meeting in the Council Chamber at Government Buildings yesterday, and were met by Mr. P. McGilligan, Free State Minister for Industry and Commerce. Mr. Murray, of the Department of Agriculture, was also present.

"Mr. McGilligan addressed the members, outlining the functions of the Council as prescribed in the new Act.

"The members then proceeded to elect officers. Professor J. J. O'Connor was elected president and Mr. P. F. Dolan treasurer. A registrar will be appointed later.

"According to the Act, the primary establishing of the Council takes place on the date of the appointment of the eight members by the Executive Council. The final establishing of the Council takes place on May 31st next, or if the Minister (after consultation with the Council) thinks it desirable, this may be postponed for a year. The term of office of the first five members in order of seniority shall expire on the final establishment of the Council. The other three members will retire in the order of seniority on subsequent anniversaries of the final establishment of the Council. Subsequent members of the Council will be elected by the registered veterinary practitioners in the Free State."

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OTHER NEWS FROM IRELAND.

Veterinary Fees.—The decision of the British veterinary surgeons to increase their fees from fourpence to sixpence for examining animals imported into Great Britain from Ireland was discussed at the last meeting of the Irish Live Stock Exporters' and Traders' Association in Dublin.

It was decided to await the replies of the Free State and British Ministers for Agriculture before discussing the matter further.

The increase of twopence a head for cattle, it was stated, would mean an increased expenditure of £8,054 8s. for all Ireland, and £6,012 0s. 2d. for the Free State per year.

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A Bovine Tuberculosis Suggestion.—At a recent meeting of the Tyrone County Committee of Agriculture a suggestion was submitted to the Northern Ministry of Agriculture to the effect that before any person could claim compensation under the Bovine Tuberculosis Order the animal claimed for should have been in the possession of the claimant at least three months.

The Ministry, in reply, stated that the Order at present insisted on the removal of affected animals at the earliest possible moment, and in their opinion the suggestion embodied in the Committee's resolution would, if carried into effect, be detrimental to the working of the Order by tending in certain cases to discourage the early reporting of the disease, with the inevitable result that there would be a spread of the disease in animals, and possible increase in infection to human beings through milk supplies.

Personal.

Birth.—WILSON.—At 134, Bonnygate, Cupar, on November 10th, to Margaret (Duncan), wife of Harry M. Wilson, M.R.C.V.S., a daughter.

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Appointment.—Mr. W. P. Blount, F.R.C.V.S., whose recent success in securing the Fellowship diploma will have been noted with much pleasure by his many friends in the profession, has recently been appointed Veterinary Superintendent, Poultry Pathological Research Laboratory, Goring, Reading, where he is specifically in charge of the Physiological and Pathological Departments.

R.C.V.S. Obituary.

BARRY, Daniel, Skibbereen, Co. Cork, I.F.S. Graduated Dublin, March 8th, 1909. Died October 27th, 1931; aged 43 years.

MOODIE, William, Rothesay, Bute. Graduated New Edinburgh, April 15th, 1875. Died November 14th, 1931; aged 77 years.

HIGGINSON, John, Knockin, nr. Oswestry, Salop. Graduated Edinburgh, May 28th, 1890. Died November 4th, 1931; aged 62 years.

SEWELL, Alfred Joseph, 55, Elizabeth Street, Eaton Square, London, S.W.1. Graduated London, July 3rd, 1877. Died November 16th, 1931; aged 77 years.

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THE LATE MR. JOHN HIGGINSON.

"Mr. John Higginson, who was the son of the late Mr. Richard Higginson, veterinary surgeon, Ruyton-XI-Towns, was a well known and familiar figure in the district, having practised as a veterinary surgeon for upwards of 40 years," says the *Oswestry Advertiser*. "While in Edinburgh he was awarded a silver medal for an essay, read before the Edinburgh Medical Association. In 1913, Mr. Higginson visited Germany and Belgium to investigate in research work for the treatment of swine fever. He was appointed Veterinary Inspector for the Board of Agriculture, and held this position at the time of his death. He took an active part in the village, both in the church and in social life. He was churchwarden for many years, and a member of the church choir, and lectern reader. He was a prominent member of the Parish Council, and was one of the oldest school managers. Mr. Higginson was a well known authority on local history,

and a few years ago compiled a local history on Knockin. One of the organisers of the Knockin Cricket Club, his skill and ability as batsman and bowler were well known in the district.

"Previous to the Great War, Mr. Higginson worked very hard in organising social events to raise money for the lighting of the village, and the Reading Room funds. He is survived by his widow, one daughter and three sons, his eldest son, Captain J. V. Higginson, M.C., died in 1919."

In Parliament.

Foot-and-Mouth Disease.

In the House of Commons on Monday Mr. Hurd asked the Minister of Agriculture if he has considered the latest report of the Foot-and-Mouth Disease Research Committee as affecting the risks involved in the importation of dried milk and other milk products from foreign countries where disease is prevalent; and what conclusion he has reached?

Sir J. Gilmour: I have considered the report referred to, and while it would appear from the laboratory experiments so far conducted that milk powder, in common with many other commodities, may be a potential carrier of foot-and-mouth disease, it has not been demonstrated that the virus survives in milk powder under trade conditions. The practicability of carrying out further tests under trade conditions is under consideration.

Mr. Hurd: Realising the importance of this matter, will my right hon. Friend expedite this further investigation?

Sir J. Gilmour: There will be no delay.

Highland Society and N.V.M.A. Tuberculosis Eradication Scheme.

At a meeting of the directors of the Highland and Agricultural Society, held on November 4th, Mr. F. L. Wallace, Candacraig, moved the adoption of a report by the Science Committee on the Scheme for the Eradication of Bovine Tuberculosis, submitted by the Scottish Branch of the National Veterinary Medical Association. The Committee state that they do not believe that a scheme, such as that originally submitted, could ever function in this country, and summarise their chief objections to any endeavour to bring such a scheme into force as follows:—

It would be an undue interference with the rights of owners of cattle to compel them to submit their cattle to a tuberculin test in which they might not have confidence, applied by a surgeon not selected by themselves. There is no definition of what tuberculin test would be applied. It is not proved that all reactors, not obviously diseased, are equally dangerous as sources of infection, nor that some reactors are not, as disease-resisters, more valuable (as some breeders of experience believe) than ordinary cattle, and therefore ought not to be slaughtered. The scheme is entirely unsuited to any herds of cattle which are not altogether or nearly self-sustaining (that is, maintained by breeding within the herd), and it would be impossible to carry on the normal cattle trade of the country under regulations such as the scheme contemplates. It would not be right to empower the Ministry, as matter of bureaucratic administration, to make regulations such as are contemplated by Article 20 of the scheme. There is no estimate of the cost of putting the scheme into operation, either as regards (*a*) the veterinary surgeons to be employed, (*b*) the cost of compensation for slaughtering reactors, or (*c*) the cost of isolation buildings and fences.

Mr. Wallace said he did not know if they would hear much more of the scheme in view of the financial position of the country. The Committee had been all equally keen on doing whatever was possible for the eradication of bovine tuberculosis, but these were the conclusions they had come to.

A Plea for Action.

The Hon. Godfrey Corbett, Rowallan, said dairy breeders in the south-west of Scotland would not be satisfied with this report. The whole of the dairy industry, and even of the farming industry, was hedged about with restrictions. To say that no compulsion was to be pressed on a man who liked to keep an infected herd in the middle of a free area, where there might be 90 per cent. of clean herds, seemed to him to be a policy which would not allow them to make any progress. Estimates for an experimental test planned in Ayrshire showed that the elimination of tuberculosis in the planned area would cost under £2 10s. per cow. Other countries, notably America and Canada, were far ahead of this country in this matter. We in this country were doing nothing. Were the breeders from these other countries going to come to us for stock in the future if they saw that we were doing nothing? He would like the Board to pass a motion saying that they realised the importance of the eradication of tuberculosis, and recognised that this scheme, while not a complete scheme in itself, did form a basis for future discussion among the persons concerned, with a view to action at some future time when the finances of the country would permit it.

On the suggestion of the Chairman it was agreed that Mr. Corbett's motion should come up at the next meeting, and the report was then adopted.

Silver Fox Association Dinner.

At the close of the first day of the sixth annual show of the Silver Fox Breeders' Association of Great Britain (recorded in our last issue) a most successful and well attended dinner was held at the Holborn Restaurant. This was presided over by Mr. R. W. Hawken, C.C., the President of the Silver Fox Association, the guest of the evening being Professor F. T. G. Hobday, C.M.G., F.R.C.V.S., F.R.S.E., who proposed the toast of the Silver Fox Industry, and in an excellent speech outlined the various diseases to which the vulpine family is subject, and informed the company of the efforts which they in the veterinary profession were making to assist the fur breeders of Great Britain. He was glad to be able to state that very great strides had been made recently in regard to the inoculation against distemper.

Mr. Hawken expressed the pleasure which it gave him to welcome Professor Hobday to the function and thanked him, in the names of all present, for the information which he had afforded.

"Plain Words about Quacks."

The above is the sub-title of a convincing contribution, headed "Don't Let Your Dog Down," made to the columns of *The Leader* of October 6th, 1931, by Principal F. T. G. Hobday. Many of our readers may be able to utilise copies of this effective exposure, and reprints will be forwarded upon application to the Royal Veterinary College, Camden Town, N.W.1.

Local Anæsthesia in Fractures.

According to Hosford, local anæsthesia for setting fractures, when performed by injecting two per cent. procaine hydrochloride directly into the hæmatoma which surrounds all parts of the fracture, is a safe and practicable procedure. Beyond the prick of the first hypodermic needle there should be no pain, except occasionally as the needle penetrates the periosteum, and sometimes as the bruised soft tissues are pressed on during reduction. The latter, however, occurs only in fractures due to direct violence. Muscular relaxation should be as good as it is with general ether anæsthesia and better than is usually obtained with nitrous oxide-oxygen. Rœntgenograms should always be taken before injecting the procaine hydrochloride so as to be as certain as possible of getting the solution between, or against, the fragments, as failure to do this is almost invariably the cause of failure to bring about relief of pain and relaxation of muscle spasm, provided a freshly prepared two per cent. solution is used.—*Jour. A.M.A.*; 97-2-139.

Shows Cancelled.

Several of the smaller summer shows have been abandoned for 1932. The committees responsible have had to meet financial losses in the last two or three years and the prospects for next season are no more encouraging. Even if a policy of agricultural development were started forthwith it would take more than a year before farmers felt justified in incurring any expenses which would not yield a cash return. The circumstances of breeders of pedigree stock are somewhat different, because the more important summer shows are their best shop window. If agriculture is to revive, next summer's show season should give them more favourable opportunities for business. When commercial men can feel some confidence in the stability of the industry they will turn again to pedigree breeders for pure blood to improve their stock. Exhibition at the shows is expensive, involving months of careful preparation, and it is to the credit of pedigree breeders that the livestock classes have been so well maintained, despite the poor prospects of business.—*The Times.*

Foreign Milk Products.

The Council of the Dairy Shorthorn Association has agreed to support the following resolution of the Central Council of Milk Recording Societies :—

" In view of the serious outlook for winter milk production, the Council feels strongly that it is essential that a tariff on all foreign milk products should be fixed at once. They recommend that a duty of at least 33⅓ per cent. should be enforced on all these products."

Correspondence.

Letters to the Editor should reach the Office not later than by the first post on Tuesday morning for insertion in following Saturday's issue.

All correspondence must bear the name and address of the contributor for publication.

The Editor does not hold himself responsible for the opinions of his correspondents.

Advisory Officers.

To the Editor of The Veterinary Record.

Sir,—The new " List of Duties " relating to the advisory scheme having now been made public in the *Record* of October 24th, comparison is possible with the former list, (published in the *Record* of January 24th, 1931) and it may be of use to summarise the chief changes made, helpful to gauge their value, and to see where further changes may be needed.

Taking the old list, we find Clause A entirely re-drafted, and that the wide reference to " diseases not ordinarily treated by General Practitioners," is omitted, the scope of the field of work being now more clearly defined in the first part of the new Clause 6. Also in this clause the advisory officer's particular attention is drawn to the " special position "—and therefore obligations—he is under as a member of the veterinary profession.

Taking Clauses C and E of the old list together, which dealt with (C) the ways in which advice might be given to farmers, and (E) how the results of advisory work might be communicated for the benefit of the agriculturist and the profession, we find that both clauses have disappeared altogether, and no reference occurs anywhere in the new list to any form of publicity being given to the work done.

This being the case, presumably advisory officers may no longer give lectures on animal diseases (outside the agricultural colleges), publish articles in the local press, give advice to individual farmers by correspondence, write and cause pamphlets to be distributed, hold conferences with bodies of farmers, or " give information as to simple treatment, provided that the general work of the practitioner is not interfered with."

I have used the word " presumably " in this connection, advisedly and hopefully, but consider that definite assurance should be given to the profession that the deletion of these clauses does not mean less, but more, freedom to indulge in those objectionable and unprofessional activities of the past.

Returning to Clause D of the old list, this re-appears unchanged as Clause 7, the Ministry having declined to accede to the request of the Committee that the advisory officers should be placed under the control of the Veterinary Department of the Ministry, or of the Veterinary Research Institutes, as " Field Officers."

Clause F is deleted, but is substantially provided for in Clause 2, and the first part of Clause 6.

Clause G re-appears substantially as Clause 3, as does Clause H, entirely unchanged as Clause 9.

In Clauses Nos. 5 and 8 of the new list, a distinct advance is made toward co-ordinating the research work of the advisory officers with the Research Institutes of Animal Pathology.

The Ministry also informs the N.V.M.A. that the advisory officers have been clearly informed that their " conduct must be ruled by the etiquette of the profession."

I think we may all well agree that, as Mr. McIntosh has said, the Ministry " has gone a considerable way to meet the profession," by removing several objectionable features, and agree also that the profession " must go some way to meet the Ministry." But, there still unfortunately remains for consideration the second half of Clause 6 which runs thus : " On every occasion *before* investigating a case the veterinary adviser should inform, and, if possible, obtain the collaboration of any practitioner or practitioners who may be employed on the farm or farms concerned." Mr. McIntosh tells us that the new list may be open to revision in the *future*, but I think we must greatly regret, with respect to this clause, that the time is not the present, for it is the crux of the whole scheme and contains the source wherefrom dissatisfaction, and also damage to the prestige and the material interests of the practitioner has arisen in the past, and will in the future.

Its extreme importance arises from the fact that it controls and directs the manner in which the advisory officer enters into his cases, and therefore directly affects the status of the practitioner " ordinarily employed." One would have thought that the officer would have come into a case, naturally and simply, through the practitioner, and in conference with him, as an expert, and great efforts were made to induce the Ministry to make it so. But this was refused, and so, at one stroke, the practitioner, instead of being the " first line of defence " was relegated to a secondary position, or perhaps one of no status at all.

It was then sought to substitute the word " must " for " should " in the clause, and so make it obligatory for the officer to " inform " the practitioner of his proposed entry upon a case, but this was also not conceded, with the obvious result that the instruction is " permissive," not " imperative."

Moreover, we must note that when the adviser does inform the practitioner of his intention to enter a case, there is no invitation to accompany him in conference; that naturally must come from the client. And so, unless the practitioner is requested by the farmer to attend, he has no status whatever, and, should he for any reason go voluntarily, can have no legal claim for fees.

As might be naturally expected, the average farmer, since he can have free advice and treatment from the advisory officer, is not inclined to incur the expense of employing his ordinary practitioner as well. Thus we find that the advisory officer, whether he observes the conciliatory gesture of " informing " the practitioner or not, upon being requested either by the farmer direct, or through an official of an agricultural college, or of the Farmers' Union, can and does go, and gives advice and treatment, both in cases where a practitioner has been attending, or in others where he has not already been called in.

This is the practical effect of Clause 6 upon the material side, but one may ask, what is the ethical position arising under the clause?

The etiquette of the veterinary profession since its incorporation as such, has been modelled upon that of the medical profession, and the code regulating the entry of any practitioner or consultant into a case is well known. No member who desires to observe the code would think of entering into a case already being attended by a professional brother, or would attend at the request of any person known to be the client of a colleague, except in an arranged consultation, or without first ascertaining from his colleague that he had given up the case, or that the client had intimated to him, in writing, that his services are no longer required. This is the time-honoured etiquette of the matter, and the very basis of all our etiquette and of our claim to a professional status—and any breach of it, either in the letter or the spirit, is highly unprofessional.

I submit that the mode of entry into a case of the advisory officer (whom I do not blame personally) under his present instructions, is in every case a breach of this code, and amounts to supercession in many. For there is no question of an arranged consultation or conference as of right, where a practitioner is already in a case, and the officer can enter into a new case in the practice of any veterinary surgeon, perhaps fifty or a hundred miles away, with no more obligation than the optional one of informing him of his intention to do so.

If the advisory scheme were part of an avowed State Veterinary Service, such a high-handed mode of entry would be legal, and the officer would be above the law of his profession, but the Ministry is careful to repudiate any suggestion of a State Veterinary Service, and says that the officer "must be ruled by the etiquette of his profession." If the ethical tribunal of the R.C.V.S. sees no breach of etiquette in this mode of entry into a case by an advisory officer, it cannot logically see one if the ordinary practitioner copies it, and the ultimate repercussion upon the morale of the profession seems obvious.

I would respectfully ask all Members of Council of the Royal College whether they would dream of entering into another man's case or practice as the advisory officer is permitted to do, or could they do so without feeling they were violating the code of their profession?

To my mind, the question at issue has a much wider scope of importance than is concerned with the advisory scheme or its affairs, for it concerns not only the prestige and material interests of the general practitioner, serious and important as these may be.

It goes further, and embraces the question of the right of the Royal College to rule in its own house, and concerns also the dignity of the whole profession, and its future status in the eyes of the public.

Yours faithfully,

EDWARD P. EDWARDS.

At St. Christophers,
Torwood Gardens,
Torquay.

Bovine Disorders.

To the Editor of The Veterinary Record.

Sir,—Your issue of the *Record* of the 14th instant is of particular interest, and I am sure country practitioners everywhere must have appreciated its contents.

Mr. Heatley's notes on milk fever confirm my findings in this district—in every case where paralysis has followed the original attack I have found abnormal livers on *post-mortem*; in fact, in all cases of paralysis, whether following milk fever or not, on *post-mortem* I have always found evidence of liver trouble. Yet how many diseased livers does one see where there is no history of paralysis. Is there an explanation?

Mr. Hudson's paper on acetonæmia, and the ensuing discussion, also gives food for thought. I had a typical sub-acute case on the 2nd instant, but find it commonest in March and April in cows calved three to five weeks. The acute condition I am afraid I have not diagnosed so far, but the paper makes me wonder if it is a condition found locally in the early spring. A cow goes down suddenly with convulsions—udder inflation or chloral relieve the spasms *so long only as the cow is kept in the middle position*: if allowed to lie flat out the convulsions return; but, alas, paralysis seems to be the result in most cases. Appetite, etc., return, but the cow cannot stand, and on *post-mortem* one finds anew signs of liver trouble. I have never noticed the "turnip" odour in these acute cases.

With regard to the urticaria mentioned in the discussion on the paper, again I wonder if this is the condition one has found in red-and-white or black-and-white cattle, where the unpigmented skin becomes red, inflamed-looking and ultimately more or less peels off. These attacks are always ushered in by an attack of colic and occur at all times of the year amongst cattle of all ages. I have seen nine of these cases in the past four years and am prompted to ask, are they a form of acetonæmia? It is a condition entirely different from the vulval-anal-labial swelling locally known as "Blain."

May I repeat that your last issue was most interesting and makes one wish for more notes and papers on bovine troubles.

J. G. HOBAN.

Mill Street,
Whitchurch,
Shropshire.
November 16th, 1931.

Acetonæmia, Post-parturient Dyspepsia, Second Cleansing, Low Fever, Slow Fever, Stall, etc.

To the Editor of The Veterinary Record.

Sir,—Since my last communication on the above disease, further work shows that by milking only once a day, the condition is specifically cured. In cases advanced to such an extent that the milk yield is practically nil, and in the nervous type of case, the preliminary treatment of "inflation" of the udder is practised—as well as the subcutaneous administration of an isotonic solution of glucose (eight ounces in nine pints of water actually used).

In those cases occurring before parturition which commonly take place during the last month of pregnancy, the glucose injection, repeated if necessary, is successful. In the cases occurring after calving, the ordinary milk production ration can be given to the patient, but in the case of the pregnant cow, the protein content of the ration should be low and the carbohydrate content high.

Yours faithfully,

OSCAR STINSON.

Charnwood,
Appleby,
Westmorland.
November 15th, 1931.

Sterility.

To the Editor of The Veterinary Record.

Sir,—In the discussion that followed Captain Brayley Reynold's paper on "Sterility in the Mare," Mr. Male asked if vitamin E had been tried on some cases, and if so, with what results.

Following the publication of a communication from Vogt-Moller and F. Bay in the *Veterinary Journal* for April, 1931, I had some wheat germ oil supplied me, put up in ampoules of 20 c.c., which I have tried with varying success on mares and cows.

The cases principally selected were those where œstrus was regular, but pregnancy did not occur.

The procedure has been to inject 20 c.c. at seven-day intervals into the gluteal muscles.

In a few cases it has been successful, but on the total cases treated it has not been encouraging.

I am inclined to doubt if vitamin or mineral deficiency has much bearing on sterility in animals in this country.

Yours faithfully,

J. F. D. TUTT, M.R.C.V.S.

1, St. Cross Road,
Winchester.